PRESENTED BY

A

TREATISE

ON

The Culture and Management

OF

FRUIT TREES.

A

TREATISE

ON

THE CULTURE AND MANAGEMENT

OF

FRUIT TREES;

IN WHICH

A NEW METHOD OF PRUNING AND TRAINING

IS FULLY DESCRIBED.

TOGETHER WITH

OBSERVATIONS

ON

The Diseases, Defects, and Injuries, in all kinds of Fruit and Forest Trees;

AS ALSO,

AN ACCOUNT OF A PARTICULAR METHOD OF CURE,

Made public by order of the British Government.

BY WILLIAM FORSYTH, F. A. S. & F. S. A.
Gardener to his Majesty at Kensington and St. James's.

TO WHICH ARE ADDED,

AN INTRODUCTION AND NOTES,

ADAPTING THE RULES OF THE TREATISE TO THE

Climates and Seasons of the United States of America.

.....

BY WILLIAM COBBETT.

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INTRODUCTION,

ADDRESSED

To Mr. James Paul, Senior,

OF BUSTLETON, IN PENNSYLVANIA.

DEAR FRIEND,

DURING the many happy days which I passed at your hospitable mansion, my observation was occasionally directed to the state of your orchards, and your method of cultivation; and I have not unfrequently perceived, that you, as well as other persons, in the states of Pennsylvania, New Jersey, and New York, experienced no small disappointment, vexation, and loss, from the failure in the crops, and from the premature death, of your fruit trees. The smallness and inferior quality of the fruit of the Peach-tree, in particular, and the swift decay of the tree itself, have, for many years past, been a subject of general regret in the middle states of America; and, it appears to me, that whoever shall first communicate to you a method of removing this evil, will render you no unacceptable service. Under this persuasion it is, that I have, for a moment, withdrawn myself from the noise and strife of politics, in order to address to you a few introductory remarks on a work, which, I think, is extremely well calculated to afford you a great deal of new and useful information, on the culture and management of those trees, which are at once the comfort and the ornament of your country.

The work is, as you will see by the title page, the production of *Mr. Forsyth*, the King's gardener at Kensington and St. James's. He, some years ago, made public his method of curing diseased and decayed fruit and forest-trees, for which disclosure, after a very minute examination, made by men of great skill, his Majesty, at the recommendation of both Houses of Parliament, granted him a reward of four thousand pounds. A full account of this examination, together with its result, you will find in the appendix to the present work.

During the last summer (1801), I went with a party of friends, to be an eye witness of the effects (of which I had heard such wonders related) of this gentleman's mode of cultivating and curing trees; and, though my mind had received a strong prepossession in its favour, what I saw very far surpassed my expectation. Mr. Forsyth, whose book was not then published, did us the favour to shew us the manuscript of it, and also the drawings for the plates, which are now to be found at the end of the work. After having read those parts of the manuscript, which more immediately referred to the drawings, we went into the gardens, and there saw every tree which the drawings were intended to represent, and of which we found them to be a most exact representation.

We examined these trees from the ground to the topmost branches; we counted the joints in the wood, ascertained the time and extent of its growth, and, in short, verified every fact that the book related. To raise fine flourishing wood from an old cankered, gummy, decayed stem; to raise as much wood on that stem, in three years, as could have been raised on the finest young tree, in twelve years; to take the rotten wood from the trunk, to replace it with sound wood, actually to fill up the hollows, and, of a mere shell, to make a full, round, and solid trunk; all this seems incredible; but of all this we saw indubitable proof. The superiority of Mr. For-

syth's mode of pruning might have been very fairly inferred from the abundance and excellence of the fruit, with which every tree in his gardens was loaded, while those in other gardens had but a partial and scanty crop, and that much inferior in quality; but Forsyth has left the merit of no part of his system to be gathered from inference, and, therefore, not content with shewing the effects of his art by the contrast exhibited between his own garden and those of other persons, not content even with this contrast as exhibited between different trees in his own garden, and standing close to one another, he has most successfully exhibited it between different branches of the same tree. By turning to the chapter on Pears, and by referring to plate 7, you will see the portrait of a Pear-Tree, one branch of which we found pruned in the common way, and the other branches according to the method taught by this book. The fruit on the former we found small, hard, knotted, and tasting almost as bad as the fruit, which, in America, is called the *Cloak-Pear;* on the other branches, the fruit was large and clear, and of an excellent flavour.

To enter into an analysis of the several parts of the work is by no means my intention. Indeed, all I intend, by this introduction, is to call your attention to a work, which, I am fully persuaded, you will find a most valuable assistant, in your rural pursuits. The detail of my remarks, alterations, and additions, you will find scattered through the several chapters of the book; but, I cannot, even here, refrain from recommending to your particular notice, the directions for planting, restoring, and perpetuating your Apple Orchards; for preserving your Peach-Trees from those mischievous insects, which now render them so very short-lived; and for the propagating and training of your vines; on which three important heads, you appear to me to stand in need of the very information that is herein communicated.

That Providence may smile on all your labours, give abundance to your fields and happiness to your family, is the sincere and earnest prayer of,

Dear Sir,

Your most faithful friend,

And most obedient Servant,

WILLIAM COBBETT.

PREFACE

OF

THE AUTHOR.

TO the many publications that have appeared on the management of Fruit and Forest Trees, it may be thought superfluous to add; and, indeed, so little am I accustomed to the practice of writing, that I feel no small degree of reluctance in offering any thing to public inspection; but an entire conviction of the advantages to be derived from the observations and directions contained in the following pages, joined to the importunity of many of the most competent judges, has determined me to make my method of pruning and training, and the success attending it, as public as possible.

Having long observed the scanty crops both on wall and standard trees that have followed the usual mode of pruning and training, I was led to make many experiments, in order to discover, if it were possible, a more successful method. Nor have my endeavours been in vain; for, after following a new mode for several years, I can with pleasure affirm, that the quantity of fruit has been remarkably increased, and the quality greatly improved.

I have in the following pages stated many facts, to evince the utility of the composition recommended, and to induce others to make a fair trial, which may be done at a very trifling expence.

I only request of those who entertain any doubts, that they will make choice of two trees of the same kind, as near as may be in the same state of health or decay, and having equal

advantages of soil and situation; let the dead, decayed, and injured parts be cut out; then to one of the trees apply the composition as directed in this treatise, and leave the other to nature: if proper attention be paid to the former, no great length of time will be necessary to shew which method ought to be pursued in future.

I hope the candid reader will pardon me for dwelling a little on this subject. It has been said, that there is nothing new either in the composition or its application. It is certainly true, that compositions of various kinds have been tried; but no one has been attended with such great success as that which is described in the following pages: Indeed, they were generally made up in a slovenly manner, and applied without properly preparing the trees; so that little good could have been expected, even if the composition had consisted of proper materials. In these particulars I am persuaded, that every impartial person will acknowledge that I have made great improvement. Former compositions have been made up of loam and cow or horse-dung, of bees-wax, pitch, tar, chalk, rosin mixed with grease, gums, &c. It is granted, that such as these may sometimes be of use, but not in general; most of them being liable to become hard, and to crack and peel off. I have tried them all, with but very little success. I have also tried a composition of tarras (which is used as a cement for building under water): This also cracked and peeled off after it became hard. Some of these compositions become so hard, that, instead of giving way to the new bark as it is produced, they cut and tear it, to the great injury of the tree.

The composition which I recommend is not liable to these inconveniences; it possesses an absorbent and adhesive quality, and is moreover of such a nature as not in the least to hurt the new and tender bark; for it easily gives way to it and to the new wood as they advance. On applying it to trees which contain a strong acid, such as oaks, apple-trees, apricots, &c. when infected with the canker, that disease may be seen oozing

through the composition and adhering to the outside, like copper dust, or rust of iron, and may be easily rubbed off with the hand. This appearance I never could observe on the application of any other composition; which confirms my belief that it acts as a strong stimulant.

When the wounds in fruit trees are so large as not to heal up in the course of a twelvemonth, I renew the composition annually, which, on its application, invigorates the trees, and seems to have the same effect on them as a top-dressing of dung has on land.

I have been solicited by some of my friends to add a chapter on forcing grapes, peaches, and nectarines; and to give a description of a house for that purpose; but as it would swell the book to too great a size, and as the subject is fully treated of by many others, it seems unnecessary to say any thing farther here, than just to observe, that the method of pruning and training recommended in this book, is equally applicable to trees in a forcing-house as to those on a natural wall. When vines are trained straight up the rafters of hot-houses, they throw out a few eyes only at top, and all the rest of the branch becomes naked; but when trained in a serpentine manner, they break equally.

Dwarf peaches and nectarines planted in the pits of forcing-houses should be trained horizontally; in which mode they will produce much more fruit than when they are trained fan-fashion.

It must be observed, that the directions, &c. in the following pages are calculated for the neighbourhood of London; it will, therefore, be necessary to make allowance, in other climates, for the earliness or lateness of their seasons, both with regard to the time of fruit being in perfection, and also for planting, pruning, &c.

For the information of those who are not acquainted with practical gardening, the following explanation of what is called *heading-down* is given.

When young trees are planted out from the nursery, as soon as they begin to break in the spring, they are cut down to three or four eyes, according to their strength, to furnish them with bearing wood: If this were not done, they would run up in long naked branches, and would not produce one quarter of the fruit which they do when this operation is properly performed. The same holds good in heading all kinds of old trees.

An opinion prevails, particularly in those parts where apple-trees are cultivated to any considerable extent, that trees never bear well after heading-down, and that it frequently kills them. This may, no doubt, sometimes happen when they are improperly headed-down all at once, by giving a sudden check to the sap, the few weak shoots not having strength to draw up what is supplied by the roots; and moreover, not being capable of sheltering one another, they are chilled by the cold, and so rendered at least unproductive, if they are not totally killed. But if heading were done gradually, that is, if every other branch all over the tree were headed at a proper length, cutting as near to those parts where the shoots appear as possible, in the month of February or March, or even as late as May;* in the course of the summer they would throw out fine long shoots. These should not be shortened the first year, unless it be necessary to shorten a few to fill up the head of the tree with bearing wood, and that should be done in the following spring; cutting them to six or eight inches long, according to their strength. In the next spring after the first branches are headed, the remaining old branches may be cut out; and these will soon fill the head of the tree with fine bearing wood. In three years, if properly managed, trees so headed will produce a much greater quantity of fruit and of a better quality than they did before the operation was performed.

* In the Middle States of America this operation should never be performed till the middle of March, and not later than the 20th of April.

A

TREATISE

ON

THE CULTURE AND MANAGEMENT

OF

FRUIT TREES, &c.

CHAPTER I.

OF APRICOTS*.

Different Sorts described... Planting and Heading... The Management of decayed Trees... Pruning of Apricots, and how to shelter them from cold.

THE Apricot, we are told, came originally from Armenia, whence it takes the name of Armeniaca, and was introduced into this country in 1562.

Linnæus, according to the Sexual System, arranges it in the twelfth class, Icosandria Monogynia†; and comprehends in the genus Prunus, the Apricot, the Cherry, and the Bird-Cherry; making them only different species of the same genus.

Although the above-mentioned plants are arranged under the same genus, yet the Cherry and Plum will never take upon

* We shall enumerate, under their respective heads, the principal sorts of fruit that are propagated in this country; with the time of their ripening, as near as possible. It is to be observed, however, that the diversity of seasons, together with that of soil and situation, will sometimes make a month of difference in the ripening of the fruit.

† Most of our eatable fruits are arranged under this class; and it is remarkable, that there is not one poisonous fruit to be found in it.

each other, nor the Apricot upon the Cherry; but the Apricot will take upon all sorts of Plums, except the Brussels.

The Names and Qualities of Apricots commonly cultivated in England, with the Time of their Ripening.

1. The Masculine. This is a small roundish fruit. It is the earliest of all the Apricots, ripening about the latter end of July, and is chiefly esteemed for its tart taste; when fully ripe, it is of a red colour towards the sun, and of a greenish yellow on the other side.

2. The Orange. This is pretty large, but rather dry and insipid, and fitter for tarts than for the table. It is of a deep yellow colour when ripe, which is about the latter end of August. This is considered as the best for preserving.

3. The Algiers. This is a flatted oval-shaped fruit, of a straw colour, juicy and high flavoured. It ripens about the middle of August.

4. The Roman. This is larger than the Algiers, rounder, of a deep yellow, and not quite so juicy. It is ripe about the middle or latter end of August.

5. The Turkey. This is a larger, and of a deeper colour, than the Roman; its shape more globular, and the flesh firmer and drier. It ripens about the latter end of August.

6. The Breda (brought from thence to England) is originally from Africa. It is large, round, and of a deep yellow colour; the flesh is soft and juicy. This is an excellent fruit, especially if ripened on a standard. It ripens about the latter end of August.

7. The Brussels. This is held in very great esteem on account of its bearing so well on standards, or large dwarfs. It is of a middling size, red towards the sun, with many dark spots, and of a greenish yellow on the other side. This has a brisk flavour, is not liable to be mealy or doughy, and is preferred by many to the Breda; but when the Breda is planted as a standard, the fruit is more juicy and of a richer flavour. This ripens in August on a wall, but not before the latter end of September on standards.

8. The Moor Park, called also Anson, Temple, and Dunmore's Breda. This is a fine fruit, and ripens about the latter end of August.

9. The Peach Apricot. This was introduced from Paris, by his grace the Duke of Northumberland, at Sion-house, in 1767. It is the finest and largest of all Apricots, and is generally thought to be the same as the Moor-Park; but upon a

minute examination the leaves will be found to differ. It ripens in August.

10. The Black Apricot. This has been very lately introduced, by Sir Joseph Banks, from France, in which country it is highly esteemed.

The trees that Sir Joseph planted at his seat in Spring Grove, near Hounslow, bore fruit last season, for the first time in this country; but, in consequence of the wet and unfavourable weather, it did not arrive at perfection*. It ripens about the second week in August.

To the foregoing may be added:

The Great Apricot,
Holland ditto,
Provence ditto,
Alberge,
Angumoise,
Blotched-leaved,
Nancy Apricot, (a fine large fruit),
The Dutch Apricot,
Grover's Breda,
Persian,
Royal Orange,
Transparent,
Portugal Apricot, (a small fruit).

For the accommodation of those who have small gardens, and yet wish to have a regular succession of fruit, we shall give abstracts of the larger selections; retaining those kinds only which are best adapted for that purpose; and of which one or more trees of a sort may be planted, according to the size of the garden, or the demand of the family.

A Selection of Apricots for a small Garden.

The Masculine, the Roman, the Orange, the Breda, and the Moor Park.

Of the Planting, Pruning, and Training of Apricots.

The best time for planting Apricots is in Autumn, as soon as the leaf begins to fall. The person who goes to the nursery

* I have had the honour of paying Sir Joseph a visit at Spring Grove, where I had the pleasure of tasting one of these Apricots; and I think it will prove an acquisition well worth cultivating. The black colour of the fruit may, perhaps, prejudice some persons against it; but the flavour, in my opinion, is very good; and if it be considered, that the wood of 1799 was not well ripened, owing to the wet season, there is little doubt, that, next year, if the season should be favourable, the flavour of the fruit will be greatly improved, and continue improving till the tree comes to maturity. The scantiness of the present crop of Apricots, Peaches, Nectarines, &c. may be attributed to the wood not being properly ripened last year.

In Mayer's "Pomona Franconia," will be found a very good figure of the Black Apricot, called also the Alexandrian Apricot.

for the plants should make choice of those which have the strongest and cleanest stems; and if he can procure such as have been headed down, (to use the phrase of the nursery-men) of two or three years growth, they will bear and fill the walls much sooner than those which have not been so treated. He should make choice of trees with one stem; or, if they have two, one of them should be cut off; for by planting those with two stems the middle of the tree is left naked, and, of course, one third of the wall remains uncovered.

I know that it is the practice of many to make choice of trees with the smallest stems; but these always produce weaker shoots than the others.

On preparing the Borders.*

If the borders wherein the trees are to be planted be new, they should be made two feet and a half or three feet deep, of good light fresh loam. If the trees are to be planted in old borders, where the earth has been injured by the roots of the former trees, it will be necessary to take out the old mould at least three feet deep, and four feet wide, filling up the hole with fresh loam, and taking care to plant the trees about eight inches higher than the level of the old border, to allow for the sinking of the earth, that they may not be too deep in the ground; but this will be more fully treated of in the chapter on Pear-trees.

When the trees are planted, they should by no means be headed down till they begin to throw out fresh shoots. Strong trees should be cut a foot from the ground; and those that are weak, about half that length.

In backward seasons, they should not be headed down so early; never until the buds are fairly broken; always observing to cut sloping towards the wall, and as near to an eye as possible, that the young leading shoot may cover the cut; [*See Plate* 1. *Fig.* 1.] which operation should be again performed in the next March or April†. The shoots that are then thrown out must be trained horizontally, to cover the wall. The number of these to be left out ought to be from three to six on each

* The American reader will not readily know what is here meant by the word *Borders;* it is therefore necessary to observe to him, that the finer kinds of fruit trees are, in England, trained against walls, and that there is generally a walk goes round the garden, running in a parallel line with the wall, at the distance of about ten feet from it; the space between the walk and the wall, is called the *Border;* so that, when the author speaks of the soil and tillage of the *Borders*, he is merely speaking of the soil and tillage of the land, in which the several trees are, or may, be planted.

† The same season will do for the Middle States of America.

side, according to the strength of the main shoot; taking care to rub off, with the finger and thumb, the fore-right shoots all over the tree, except a few which may be wanted to fill up the wall, near the body of it. [*See Plate* 1. *Fig.* 1.] *

In the second year, the horizontal shoots must be shortened in the same manner, according to their growth; and so on every year till the wall shall be completely covered from top to bottom.

It is a frequent practice with some gardeners, to head down the trees at the time of planting; which very often proves fatal to them.

Of old and decayed Trees.

When a tree becomes thin of bearing wood it will be necessary to cut down the whole of it, as near to the place where it was budded as possible; remembering always to cut at an eye or a joint. If there should be any young shoots on the lower part of the tree, it will be proper to leave them, training them horizontally, which will check the flow of the sap, and thereby render them much more fruitful.

Very frequently, when large branches have been cut off in a careless manner, and the wounds left to nature, the whole tree is infected with the gum and canker; which, if not checked, will in a short time totally ruin it.

The best remedy in this case is, carefully to pare off the cankered part of the bark with a knife, or other convenient instrument. You will frequently find the white inner bark infected, which must also be cut away, till no appearance of infection remains; this may be easily known by the brown or black spots, like dots made with a pen, of which not one must be suffered to remain.

All the branches so cut and pared should be immediately covered with the composition in a liquid state; the preparation and application of which will be particularly described in another place.

When trees are in a very bad condition, they should be cut in a partial manner, taking off the worst branches first, particularly those in the middle of the tree, always cutting as near to the graft as possible; or every other branch may at first be taken

* The directions which are given for trees against a wall, will apply, with equal force to standard trees, except that the stems, or trunks, of these latter should be higher, and, consequently, they should not be headed down so near the ground. The Apricots, which I have seen in America, are hard, and not above one-third part as large as the same fruit in England, a difference which is entirely owing to want of attention to rules such as are here laid down.

out, leaving the rest to bear; by which means there will be a supply of fruit while the other parts of the tree are renovating. It should be remembered, however, that all the cankered bark must be cut off without loss of time; otherwise the new wood will be infected.

Old trees thus headed down will sometimes throw out very strong and vigorous shoots, which it may be necessary to top, as it will cause them to throw out side-shoots; but they should never be suffered to have any fore-right spurs, except little dugs. The topping should be done in the beginning of June, which will cause the tree to produce fine bearing wood for the next year. Those trees must be pruned in March following*, shortening the shoots from fifteen to six inches, but according to their strength, always leaving the strongest shoots longest.

Wherever the knife has been used, the composition must be immediately applied.

I have a great dislike to Autumnal pruning of fruit trees; of all kinds of stone fruit in particular; for by pruning at that season you seldom fail to bring on the canker; and no fruit trees are more liable to this disease than the Apricot. The reason is obvious: The great acidity in these trees, the exposure of the wounds, and the dormant state of the sap, pre-dispose to mortification; whereas, in spring, when the sap is beginning to flow, and will follow the knife, the lips will quickly grow. If the branches are small, a fresh bark and fresh wood will in one season completely cover the wound; but if large, a time proportionate to their size will be occupied; this process, however, is manifestly much accelerated by the application of the composition, which excludes the air and wet from the air and sap vessels of the tree.

Of the Sorts.

The Breda is the best and richest-flavoured for a standard, although the Brussels is frequently preferred.

The Breda, the Brussels, and the Moor-Park, should always be planted on an East or West aspect. Others may have a South aspect†.

* The latter end of June and March should be taken, in America for this business. I will here observe, once for all, that I confine my observations to the *Middle* States of the Union.

† Apricots bear pretty well as standards, even in England, and it cannot be supposed, that, if the the above directions were well attended to, they would not produce great quantities of fine fruit in America.

CHAPTER II.

OF PLUMS.

Different Sorts of Plums cultivated in England....Of Plant-heading and training them...Of Standards in Orchards, and Dwarfs in Gardens....The Management of old decayed Trees.

THE Plum is generally supposed to be a native of Asia, and the Damascene to take its name from Damascus, a city of Syria.

This Genus of Plants is arranged by Linnæus in the twelfth class of his System.

The Names and Qualities of those Plums which are commonly cultivated in England, with their Time of ripening.

1. The Jaunhative, or White Primordian, is a small plum, of a yellow colour, and mealy. It ripens in the latter end of July, or beginning of August. One tree will be sufficient for a garden.

2. The Early Damask, commonly called the Morocco Plum, is middle-sized, and the flesh good. It ripens about the beginning of August.

3. The Little Black Damask Plum is a rich fruit, a good bearer, and is ripe about the latter end of August.

4. The Damask Violet of Tours. This is a fine rich plum of a bluish colour, and is ripe in August.

5. The Red Orleans Plum is large of a rich juice, and is ripe in the latter end of August.

6. The Fotheringham is an excellent plum, of a dark red and the juice rich; there is hardly any plum that excels it.

7. The Blue Perdrigon Plum is of a very good taste, and ripens in August.

8. The White Perdrigon Plum is a pretty good fruit, and has a sweetish taste mixed with tartness. It ripens in the beginning of September.

9. The Red Imperial Plum, or Red Bonum Magnum, is a great bearer, and mostly used for baking. It is ripe about the latter end of September.

10. The White Imperial Bonum Magnum, or Egg Plum, White Holland, or Mogul Plum, is a large fruit, and, like the red, mostly used for baking. This is a great bearer, and ripens about the beginning of October.

11. La Royal is a fine plum, equal to the Green Gage, but a shy bearer. It is of a red colour, and ripens in the latter end of September.

12. Little Queen Claudia is a small rich fruit, ripe in September.

13 Large Queen Claudia, or Dauphiny. This is an excellent plum, of a yellowish green, and ripens about the beginning of October,

14. The Green Gage Plum* is of an exquisite taste, and eats like a sweetmeat. Its colour and size sufficiently distinguish it from any other. It ripens in August and September.

15. Draps d'Or is a good plum, and a plentiful bearer. It is ripe about the latter end of September.

16. The Chester Plum is rich, and a great bearer. It is ripe about the latter end of September.

17. The Apricot Plum is large and sweet, and is ripe in the beginning of October.

18. The Maitre Claud is a large round whitish plum; the juice is very brisk, though sweet. It is accounted among the best white plums that we have, and ripens about the beginning of October.

19. The Myrobalans, or Cherry Plum, is a middle-sized sweet fruit, and ripens about the beginning of September. This plum is frequently planted for ornament, as it blossoms early.

20. La Mirabelle, of an amber colour, and small, is full of juice, and excellent for sweetmeats. It bears well, and is ripe about the beginning of September.

21. The Brignole Plum. This is esteemed the best plum of any for sweetmeats; the flesh is dry, but of a rich flavour. It is ripe about the latter end of September.

22. The Red Diaper Plum is large, and of a very high flavour. It ripens about the beginning of September.

23. The Saint Catharine Plum is one of the best, and is much used for confectionary; it is also very good for the table, having a rich sweet juice; and is a good bearer, hanging the longest of any upon the tree. I have had them in gathering six weeks. It ripens about the latter end of September.

24. The Imperatrice, or Empress Plum, has an agreeable flavour, and ripens about the middle of October. This is one

* There are several varieties of this plum, and all good.

of the latest plums, and should not be gathered till it begins to shrivel; it will then eat like a sweetmeat, and make a great addition to the table in the latter end of October and beginning of November.

25. Monsieur's, or the Wentworth Plum, is a large fruit resembling the Bonum Magnum. It ripens about the beginning of October, and is good for preserving, but too sharp to be eaten raw.

26. The Winesour, a Yorkshire plum, is one of the best for preserving. It is ripe in October.

To the above may be added:

Admirable,
Black Damascene,
Black Pear,
Blue Matchless,
Damas noir de Tours,
Don Carlos's,
Double-flowered,
Early Blue Primordian,
Early Red Primordian,
Early Amber,
Early Tours, or Precoce de Tours,
Early Violet,
St. Julian,
Semina,
Small White Damascene
Spanish Damascene,
Striped-leaved,
True Prune,
Early Orleans,
Fine Early Plum,
Jacinthe, or Hyacinth,
Koa's Imperial,
La Prune Suisse,
La Prune valeur Valentia,
Matchless,
Maugeron,
Muscle,
Persian,
Red Queen Mother,
Royal Pea,
Royal Dauphin,
Verte-dock, or Verdock,
Whitton, or Nutmeg,
White Bullace,
White Orleans,
White Pear,
White Perdrigon.

A Selection of Plums for a small Garden.

The Jaunhative; Early Damask; the Orleans; La Royal; Green Gage (different sorts); Draps d'Orr; Saint Catharine; and Imperatrice. The Magnum Bonum for baking, and the Winesour for preserving.

On the Choice, Planting, Pruning, &c. of Plum-Trees.

When you choose your trees, let the same directions be observed as in the choice of Apricots. Choose clean straight plants with single stems; as those with two never make handsome trees for walls or standards. Manage the border as before directed for Apricots; digging the holes the same width and depth, and loosening the bottom; then fill up the holes

with fine fresh loam, or the mould that was used the preceding year for melon and cucumber beds; and be careful to keep the mould a proper height above the border, and the roots of your trees as near the surface as possible, spreading them horizontally. If there are any tap-roots they should always be cut off, as should also the fine hairy roots, as they are liable to get mouldy and rot, and thereby bring on a putrefaction of the mould about the root of the tree. If the roots are not spread near the surface of the ground, it will prevent the sun and air from penetrating to them; and the fruit, of course, will not have so fine a flavour.

Never cut the stems of young Plum-trees when first planted, but leave them till the buds begin to break; then you may head them down to five or more eyes, always observing to leave an odd one for the leading shoot: remember to cut sloping towards the wall, and as near to an eye as possible. Thus managed, the shoots will soon fill the wall with fine wood. If you find that some of the shoots are too luxuriant, you may pinch the tops off with your finger and thumb, about the beginning of June in the first year after planting; by doing which you will obtain plenty of wood to fill the bottom of the wall. A great deal depends on the first and second year's management of your trees.

The distance from each other at which Plum-trees should be planted against a wall depends on the height of the wall. If the wall be ten feet high, which is the common height they may be planted at eight yards distance from tree to tree; but if the wall be twelve feet high, or more, seven yards will be sufficient. For my part, I prefer a wall of ten or twelve feet, which will be found high enough, if the branches are trained horizontally; by which means your trees will be much more fruitful, and not grow so luxuriantly.

By training an upright shoot on your Plums, as directed for Pears, you will get fine kind shoots from the sides. The leading shoot should be shortened, leaving it from one to two feet long, according to its strength. If the leading shoot be very strong, you may top it twice in the summer, as directed for Pears, and at the same time that you top them; repeating the same every year till the wall is filled to the top. I would always recommend, where it is convenient, to allot one wall for Plums and another for Cherries, as they always thrive best by themselves.

As you will have Plum-trees to spare, that were planted between Pear-trees, when they begin to meet, they should be planted against another wall, or planted out as Dwarf Stand-

ards. Those which you intend for Standards should be prepared in the following manner. The year before you mean to transplant them, cut in the side-shoots at different lengths, from one foot to three, according to the size of the trees; suffering them to grow rude all the summer, neither nailing-in nor cutting the side and foreright shoots. Some time during the winter open the ground round their roots, and cut in the strong ones (which will cause them to put forth fine young fibres); then fill in the earth. In the following autumn, or during the winter (the sooner the better), you may transplant them out as Standards*. If you intend to plant them against a wall, never cut the side-shoots, but only the roots; by this method the trees will bear fruit the first year after transplanting, and there will be a great saving of time and money. I have often transplanted old Plum-trees that have been headed down, that have made very fine roots, which I have divided, and thereby obtained four or five trees from one, cutting them so as to form them into fine heads. Some that were transplanted in 1798 were in full blossom in 1799, producing some fruit, and this year (1800) bearing a full crop.

The ground in the borders and quarters where fresh trees are to be planted should be well trenched, two spits deep at least, to give the roots room to run into the fresh-stirred ground.

When you plant trees without stirring the mould, they seldom thrive well.

When Plum-trees are planted for Standards in an orchard which is to be kept for grass, they should be in rows at the distance of twenty yards from each other†. If in the kitchen garden for Standards, I would always recommend the planting of Dwarfs. You may train the tree up to have a stem of about three feet high, at the distance of seventeen yards. If the garden is laid out with cross-walks, or foot-paths, about three feet wide, make the borders six feet broad, and plant the trees in the middle of them. In the Royal gardens at Kensington, which are very long and narrow, and where the winds

* In transplanting of trees, especially large ones, I consider it to be of great consequence, that they be placed in the same position (that is, having the same parts facing the same points of the compass) as formerly. If you take notice when a tree is cut down, you will find that three parts in four of the growth are on the North side.

† The directions, contained in this paragraph exactly apply to America; but almost all the rules relative to planting and pruning wall trees, apply equally to standards; and as the author has, in general, given his directions in speaking of wall-trees, the American reader will be careful not to overlook them, merely because they are not repeated in speaking of standard-trees.

are very hurtful, I have planted two rows of Apple-trees, intermixed with other fruit-trees, alternately, one row on each side of the middle walk (which runs the whole length of the garden), at the distance of seventeen yards from each other. I have also made cross-walks of three feet broad, at the distance of seventy yards, with borders on each side six feet wide, having two rows of trees in each border, about twelve or fourteen feet asunder. These Dwarf trees are very useful in breaking the force of high winds, and are at the same time of such a height that a man standing on the ground may gather the fruit. As Plum-trees may be planted in the same manner and for the same purpose as the above, you can have the quarters clear for crops for the kitchen, and a free air will be admitted, which you can never have if you plant Espaliers: Dwarf Standards can be kept to what size you please; they look much handsomer than Espaliers, and produce a greater quantity of fruit.

On pruning and restoring old and decayed Plum-Trees.

I have restored Plum-trees, some of which were so far decayed as to have only from one to two or three inches of bark left; they are now completely filled up with sound wood, with large heads, which at four years growth filled a wall sixteen feet high, and are at this time full of fine fruit; some of the stems are several inches in circumference, bearing treble the crops produced by young trees that have been planted three times as long as they have been headed down.

Where the trunks are become hollow, I always cut out all the loose rotten parts, and also examine the roots, cutting off what is rotten, injured, or decayed. This method should be pursued with all hollow and decayed trees; and, if properly executed, they may be so completely filled up, as scarcely to leave a mark behind, even where the wood is totally decayed.*

I have had shoots from Plum-trees which have been headed, that have grown upwards of seven feet long, and as large as a walking-stick, in one summer; this should never be suffered; but they should be pinched off with the finger and thumb, in the beginning of June†; close to an eye or a bud; unless the wall be filled up to the top; in which case they should never be cut while they continue to bear handsome fruit. Before they begin to cease form bearing, you must always begin with shortening every other shoot, leaving them only from six inches to

* Astonishing as this really is, I was witness of the truth of the statement.

† The middle, or latter end of June, for America.

a foot long, and nail them in till the second year, taking care to rub off the superfluous and strong fore-right shoots; by that time they will begin to bear; then cut out the others that have done bearing: By this method you will keep the trees in a flourishing state. When the branches are thus managed, they will frequently throw out small dugs, or fore-right shoots, about an inch or two long, which will flower next year. They should never be shortened till after the fruit is set and become about the size of a large pea; by that time the leaves will have covered the fruit, and be able to protect it from the inclemency of the weather. You may now shorten these shoots close to the fruit, which will leave them from one to two inches long. This method I have practised with great success for several years. By leaving these short fore-right shoots, the fruit is protected till it is out of danger of being killed by the frost, or stunted by the cold North and North-west winds that happen about the latter end of March and beginning of April. The cold chilling rain and snow, which are also very injurious to the fruit, will be thrown out by the branches standing out from the trees. I by no means like to see spurs standing out from the wall; for they are always sure to be injured by the frost and cold winds. [*See Plate* 2. *Fig.* 2.] When the shoots are left naked, I have often seen the plums turn yellow, and drop after they have grown to a considerable size, from their being exposed to the cold frosty winds and rain. Plums are more tender than any other sort of stone fruit, owing to the flower-cup dropping sooner than that of the Peaches, and Nectarines, &c.* They are very liable to decay, after cutting off large limbs or branches, which always brings on the gum and canker, if it be left to Nature to perform the cure. I would, therefore, recommend the application of the composition (in the same manner as directed for other sorts of fruit-trees) to every shoot where the knife touches, as soon as the trees are cut.

If you wish your fruit to be large and fine, you must take care to thin it where it is too thick; but that must not be done too soon, lest it should be pinched by the cold. The fruit ought to be of the size of a small marble, and well sheltered by the leaves, before you attempt to do this. Never pull off the leaves that shelter the fruit, till it is full-grown and be-

* Some of the directions here given apply exclusively to wall-trees; but if the manner of pruning here recommended were observed in America, the fruit of the Plum would be much larger, finer flavoured, and in greater abundance than it now is. Mr. Forsyth prunes his standards by the help of a double ladder, which might be also done in America.

gins to turn. This will be more fully treated of, when we come to the management of Peaches and Nectarines.

I have taken up several old trees from the walls, when they have grown too near each other, and planted them out as Standards, at the same time shortening their branches to form handsome heads, which are now full of fine fruit. These trees would, by any other person, have been thrown to the fagot-pile.*

* Several of these trees, I saw, in 1800, loaded with fruit so heavily as to require props to support the branches. The old stumps, out of which Mr. Forsyth had brought the new and pacific branches preserved their crooked and cankered shape, while the new wood was extremely luxuriant and clear. The same I observed with respect to pears, apples, and other fruit trees, which were bending under the weight of their fruit, while, in the neighbouring gardens, though only on the other side of the wall, the owners had hardly fruit enough for their tables.

CHAPTER III.

OF PEACHES.

Different Sorts of Peaches described.....Of the Soil....Of planting, heading, pruning, and training.....Method of making Incisions .....Of covering Peach-Trees, watering, &c.

THE Peach, Persica, is a native of Persia, and was introduced from thence into Europe. It belongs to the twelfth class of Linnæus.

The following are the Sorts cultivated in this Country.

[NB. Those marked with an Asterisk (*) adhere to the stone, and are by the French, called Pavies, and by the Americans, Cling Stones.]

1. The White Nutmeg Peach. This peach is small, and the juice sugary. It is only esteemed as being first ripe. It is in eating in July, and soon grows mealy.

2. The Red Nutmeg is a great bearer, and valued for its early maturity. It is of a bright vermilion colour, and has a fine musky taste. This peach is much esteemed, and ripens about the beginning of August.

3. The Early Avant has an agreeable flavour, and ripens in August; but is apt to be stringy.

4. The Small Mignonne is very red on the side next the sun, and the flesh has a rich vinous juice. It is ripe about the middle of August.

5. The Anne Peach (which is said to have taken its name from Mrs. Anne Dunch, of Pusey in Berkshire, where it was first raised) is a fine early fruit. It is ripe about the middle or latter end of August.

6. The Royal George Peach comes in soon after the former; the flower is large and white; the fruit of a dark red towards the sun, and full of a fine rich juice. It is ripe about the latter end of August.

7. The Royal Kensington is one of the best peaches that we have; of a high red colour next the sun, and of a yellow-

ish colour next the wall; it is a good bearer and not liable to be blighted. The flesh is full of rich juice. It ripens about the latter end of August, or beginning of September*.

8. The Yellow Alberge is of a tolerable size and good taste, but should be perfectly ripe before it is gathered; otherwise it is good for nothing. It is ripe about the middle of August.

9. The White Magdalen. This peach is seldom high-flavoured, unless it be forced, and then it is excellent. It ripens about the middle of August.

10. The Early Purple. This fruit is large, of a fine red colour, and full of rich vinous juice. It is an excellent peach, and is ripe about the latter end of August.

11. The Large, or French Mignonne, is a beautiful large red peach, and has a sweet high-flavoured juice. This is one of the best French peaches, and is ripe the latter end of August.

12. The Bourdine is a pretty large fruit, of a fine red towards the sun; the juice is rich and vinous; the tree is a good bearer, especially when old, and the fruit highly esteemed. It is ripe about the middle of September. This tree will do very well in standards, and produces plenty of good fruit.

13. The Chevreuse, or Belle Chevreuse. This is a good peach: it is of a middling size, and of a beautiful red colour; the juice is rich and sweet. It ripens about the beginning of September, and is a plentiful bearer.

14. The Red Magdalen is large, and full of rich sugary juice of excellent flavour. It is a very good peach, and ripens in the beginning of September.

15. The Early Newington, or Smith's Newington, is of a beautiful red colour towards the sun, full of a sugary juice, and ripens in the beginning of September.

16. The Mountauban is of a deep red, inclining to purple, next the sun; but pale towards the wall. It has a fine melting flesh, with a rich juice; and the tree is a plentiful bearer. It is ripe in the latter end of August.

17. The Malta Peach. This is of a fine red next the sun, and has a white melting flesh; the tree is a good bearer, and the fruit ripens in the beginning of September.

* This handsome peach, I am told, was, with some others, sent from France to her Majesty, upwards of twenty years ago. I have therefore taken the liberty to give it the above name, that it may not be confounded with Mr. Grimwood's Kensington Peach. When I came to Kensington, in 1784, I found it mentioned in the Catalogue as a new peach from France.

18. The Noblesse. This is a large peach, of a bright red colour towards the sun; the flesh is melting, and the juice very rich in a good season. This tree is a good bearer, and the fruit is ripe in the beginning of September.

19. *The Old Newington Peach is of a fine red colour, has a high vinous-tasted juice, and is esteemed a good Pavie. It ripens about the latter end of September.

20. The Chancellor is one of the best sort of peaches, and of a fine red colour next the sun; the skin is thin, the flesh melting, and the juice very rich. It ripens about the beginning of September.

21. The Bellegrade Peach, or Gallande, is very large, and of a deep purple colour towards the sun; the flesh melting and full of a very rich juice. This is a fine peach and ripens about the middle of September.

22. *The Lisle Peach is of a middling size, and of a fine violet colour next the sun; the flesh is melting and full of a vinous juice. It ripens about the middle of September.

23. The Rosanna is of a fine purple colour next the sun, and has a rich vinous juice. It is reckoned a good peach, and is ripe about the middle of September.

24. The Rambouillet (commonly called the Rumbullion) is pretty large, and a fine red colour next the sun; the flesh is melting, and the juice vinous and rich. It ripens about the latter end of September.

25. The Admirable is a very large and beautiful peach, finely coloured with red towards the sun; the flesh is melting, and the juice sugary and of an exquisite taste. It ripens about the middle of September.

26. *The Bellis (La Belle de Vitry). This fruit is of a pale red towards the sun; the flesh is white, and the juice vinous and rich. It is ripe in the latter end of September.

27. *The Portugal is of a beautiful red towards the sun, and generally spotted; the flesh is firm, and the juice rich and vinous. It ripens late in September.

28. La Teton de Venus (Venus's Breast). This is a middle-sized fruit, somewhat longish; the side next the sun is of a pale red, the flesh melting, and the juice sugary and rich. It ripens about the latter end of September.

29. La Pourpree (the late Purple). This fruit is large and of a purple colour; the flesh is melting, and the juice sugary and rich. It ripens the beginning of October.

30. The Nivette is of a bright red next the sun, and of a yellowish cast towards the wall; the flesh is melting, and full

of a rich juice. This is an excellent peach, and ripens about the middle of September.

31. *The Monstrous Pavy of Pomponne. This peach is very large, and of a round form; the flesh is white and melting; it is of a fine red colour towards the sun. This ripens in the latter end of October.

32. *The Catharine Peach is a fine large fruit of a round make, and of a beautiful red colour towards the sun. The flesh is melting, and full of a rich juice. The pulp is improved by its laying three or four days before it be eaten. It ripens about the latter end of October: but there are not many situations where it ripens well. It is a plentiful bearer.

33. The Bloody Peach. This is of a deep red next the sun; the flesh is also of a deep red. It seldom ripens in England without forcing; but is reckoned excellent for baking and preserving.

34. The Royal (La Royale). This is a large round peach, of a deep red next the sun; the flesh is melting and full of a rich juice. It ripens in the latter end of September.

35. The Cherry Peach (Peche-cerise, of Duhamel,) is small and globular. It is of a beautiful red colour towards the sun, and of a whitish wax colour on the other side. Its colour, which resembles that of the Pomme d' Api, gives this little peach a beautiful appearance. The flesh is melting, and the juice has a tolerably good flavour. On a dry soil and good exposure, it ripens about the beginning of October.

36. Grimwood's New Royal George is a high coloured peach, and of a fine flavour. It ripens in the latter end of August, or beginning of September†.

37. The Superb Royal is a fine large peach of a red colour towards the sun, and pale on the other side. It ripens in September.

38. The Queen Charlotte nearly resembles the small Mignon, and ripens about the same time.

39. The Late Violet is esteemed a very fine peach, and ripens in September.

To the foregoing may be added:

Allen's Royal,	Low's Large Melting,
Bourdeaux,	Mallacotan,
Buckingham Mignonne,	Millet's Mignonne,
Carlisle,	*Pavie Admirable,
Double Swalch,	*Pavie Royal,

† This peach seems to be the same as the Royal George.

Double Blossomed,
Double Mountagne,
Dwarf Orleans,
Eaton,
Fairscot's,
Ford's Seedling,
Hemskirk,
*Incomparable,
Lord Falconberg's Mignonne,
Peche de Pau,
Ronald's early Gallande,
Sion,
Smooth-leaved Royal George,
Steward's late Gallande,
Vanguard,
Violette hative,
White Blossomed.

Peaches proper for a small Garden.

The Early Avant; Small Mignonne; the Anne Peach; Royal George; Royal Kensington; Noblesse; Early Newington; Gallande; Early Purple; Chancellor; Nivette; the Catharine; the late Newington.

Of the Planting, Pruning, Training, &c. of Peach-Trees.

Peaches require a lighter soil than Pears and Plums; and a light mellow loam is best. If the natural ground should be a strong brick mould, or rather inclinable to clay, it will be necessary to take out some of it, particularly when you first make the borders, and mix with it some light mould, sand, or old lime rubbish. At first making the borders, you should take out the earth where the trees are to be planted, as before directed for Apricots; and keep working the rest with rotten leaves, or street-dung, and the above mixture; throwing them up, as early as you can spare them, in ridges rough from the spade, which will let the frost and sun penetrate and meliorate the ground.

If the ground should be wet, make some drains across the borders, to lead the water from the roots of the trees to a drain made along the middle walk. If the ground should have a slope, you can very easily convey the water off when the springs are near the surface; but if the wet be occasioned by rains, and the stiffness of the ground holds the water, you should give the border a proper slope to carry it off from the roots of the trees. Fill the cross drains, leading to that along the middle of the walk, with old bricks or stones at bottom, and at top with rough gravel, which will keep the ground dry; at the same time laying it sloping from the wall, so as to throw the water that falls in heavy rains toward the middle walk, where it will soon soak into the ground. When water is suffered to stand about the roots of tender trees in strong land, it is sure to bring on the mildew, which will spoil and render them good for nothing but the fagot-pile. Sometimes,

indeed, I have recovered them, by moving them to another aspect. All the French Peaches are very liable to mildew on strong land.*

Where there is not a proper descent to carry off the water, the bottom of the main walk should be filled up with brick-bats or stones, and the small stones raked from the quarters of the garden, making a dry drain along the middle 9 inches wide, or more, covered with bricks or stones. The walk, when finished, should have a gentle rise in the middle, in order to throw the rain water toward the edges.

Where the soil is a sour wet clay, it will be necessary to throw into the bottom of the border brick-bats covered with lime rubbish, or core from the skreenings of lime; then water it, and when nearly dry ram it well, which will convert it into a hard solid surface, and prevent the roots of the trees from penetrating the wet earth below. It will also serve to carry off the water to the drains.

With regard to the choice of Peach Trees, the directions already given for Apricots will serve. They should be procured in the latter end of October, or beginning of November, as soon as the leaf begins to fall; and, if possible, the ground be ready beforehand.

The ground, if new borders, should be well trenched to receive the trees; if to supply the places of others which have been removed, or where trees have died, all the old roots should be carefully taken out, and fresh mould put in where the old was taken away; remembering to raise the new mould a proper height above the old; as it is a very great hurt to fruit trees, when they are planted too deep: if they are not kept up above the level of the old ground at first, they seldom thrive well.† When the trees are planted, water the roots well to settle the mould, letting it remain for some days till the water is absorbed; then tread the mould, and fill the holes up to the top; observing the same rules as before given in case of dry weather, letting fresh-planted trees remain unpruned till the Spring.

When you see the buds begin to shoot, if the trees be maiden trees of one year's growth, you may head them to five

* Though the author is here speaking of wall trees alone, his directions will furnish the American planter with every information respecting the soil, situation, &c. which he ought to choose for his standards. Owing to the want of such information it is, that we see the Peach-trees in Pennsylvania, &c. perish at so early an age.

† I have observed this error of planting too deep to be very prevalent in America. It should be carefully avoided.

or more eyes*, according to their strength; then rub on a little of the composition where you cut off the top, observing to cut it sloping, as before directed, and as near the top buds as may be, and also to rub off the fore-right shoots. If the leading shoot be very strong, pinch off the top of it about the beginning of June, which will make it throw out some fine strong shoots. None of the shoots should be suffered to grow too long during the first and second years; which may always be prevented by pinching the ends of them; but they should never be topped, when the tree sends out fine kind shoots; till the spring following, when you may prune them, according to the strength of the tree, and the quantity of wood it has made during the preceding summer, leaving your shoots from six to twelve inches long: It is too common a practice to lay in the shoots at full length, taking off only the points of the branches, which generally after a few years, leaves the tree quite naked: Whereas if attention were paid to the training, especially for the first four years, you could always fill the tree with fine bearing wood from top to bottom, and they could produce a great deal more fruit, and of much finer quality, than when they are run up in the former way; for those trees, in general, are so weak that they have not strength to bear good fruit. The third year, if care be taken to manage the trees properly in summer, you may bring them into a bearing state. If the ground be strong, they will grow very vigorously; in that case you must pinch all the strong shoots about the month of June†, which will make them throw out side-shoots; these, if not laid-in too thick, will make fine bearing wood for the succeeding year. If you suffer the strong shoots to grow to their full length, they will be large and spongy, and will neither produce fruit nor good wood for the following year††. Sometimes weakly trees are covered over with blossom; but if too much fruit be suffered to remain on them, they will be weakened so much that they will never recover. In that case, I would recommend picking off the greater part of the fruit, to let the tree re-

* This is for a wall-tree. Standards must, of course, not be headed down so low.

† Latter end of June, for America.

†† This is one great cause of the badness of the peaches in America. No attention is there ever paid to the direction here given.

cover its strength*. When you prune trees in the above state, observe never to prune at a single flower-bud; if you do, you will be sure to kill the shoot; or, at least, it will die as far as the next wood-bud. [*See Plate* 3. *Fig.* 2.]

On observing, you will find some shoots, and sometimes whole trees, with nothing but single flower-buds. These sorts of shoots should be laid-in at full length. Always observe the next branch that has got some wood-buds, and cut them close, that they may produce fine wood to supply the place of those that have only flower-buds, which may be cut out next year†.

When peaches come into a bearing state, you will, in general, see two flower-buds close together; if you look between these flower-buds, you will see what is called a wood-bud; you should always cut at such double buds; as from between them come out the shoots that produce the fruit for next year.

If you observe the above rules, you cannot mistake in pruning your peaches. [*See Plate* 3. *Fig.* 2.]

When the trees come into a bearing state, you may keep them in a flourishing one by proper management, and attention to the summer pruning. I have often topped the strong shoots twice in the course of the summer, before I could get them to produce fine kind bearing wood. I have often had shoots that grew, in the course of one summer, upwards of six feet in length, and as thick as my thumb. When such shoots as these are suffered to grow to their full length, the lower part of the wall (or of the standard tree) will be left naked [*See the Plate, Fig.* 1.]; besides, these strong shoots exhaust the tree of its strength, and never produce good wood when you neglect to top them in summer. I would recommend to cut out such shoots when the trees are pruned in the spring, and to leave only the fine kind bearing wood, which you may know by two small leaves where the flower-buds will be in the following year; the strong shoots have only one leaf bud at each eye. You should always rub off all the useless little shoots, leaving only the best, and these not too near together. Be very particular to pick off all the side-shoots that come out near the tops of the branches; which, if left, would weaken the fruit-bearing branches for next year. This should be done as soon as you can lay hold of these shoots with your

* This precaution, also, is almost entirely neglected in America.

† All these directions are of the greatest importance.

finger and thumb: if you suffer them to grow strong, they will hurt the fruit-bearing shoot.

Of Pruning and Training old Peach-Trees.

When the trees run up too high and thin, [*See Plate* 3, *Fig.* 3.] the best way is to cut them as far back as you can find any young shoots or buds*. You must always leave some young shoots or buds on peach-trees, otherwise you endanger the life of them. Never head them as you would Apricot, Apple, or Pear-trees. If you cut or head down Peach-trees without attending to the caution given above, you run a great risk of killing them; but if there are a few young shoots, the top may with safety be cut off, just above them, as they will lead the sap up and produce strong branches, which should be topped as you would do a young tree.

It is more difficult to procure new wood from old Peach-trees than from any other, except Nectarines. I have often made incisions in the old branches, about the joint, cutting out a piece from one to three inches according to the size of the branches. [*See Plate* 11. *Fig.* 2.] This should be done in several places of the tree, to furnish it with young wood; always rounding the edges where the incision is made which should be above the joint, and as near to it as may be. The operation should be performed in the month of April, (May, for America) but never cut off the old branches, unless you perceive some young shoots making their appearance. When they are about three or four inches long, cut off the old branch, which will cause the fresh young wood to make a rapid progress the first summer, and you will have fine fruit on them the following year.

Always use the composition where you cut off old branches; observing to round the edges, and cut out the canker which you find in the old bark where the branch was amputated.

In peaches, the canker is of a brown colour; and in the bark, it appears in small specks or dots, as if made with a pen. All these should be cut out clean; for if any part of the canker remain, it will affect the new wood as it begins to grow.

* This plate represents a tree against a wall, but the observations apply equally to a standard-tree. Whenever a standard shoots up high, without having a number of side-shoots, to form a proportionate head, it should be cut down in the manner above described. This remark applies to trees that have already been suffered to run up too high and thin. Trees hereafter planted will not, of course, be permitted so to do.

Wherever you see the gum oozing, you may be certain that the canker is not quite eradicated.—[*See the Chapter on the Canker.*]

It will frequently be necessary to look over your trees, and rub off what superfluous shoots remained after going over them the first time. Indeed, if you were to examine the trees once every fortnight, it would be so much the better, as by so doing they can be kept in perfect order. I have so accustomed myself to look over my trees, that I do it as I walk about my ordinary business, which saves a great deal of time.

When the peaches are about the size of a small marble, begin to thin them; which operation must be left to the judgment of the person who does it; but it should be according to the strength of the tree. This ought to be done very regularly, that the fruit may be equally dispersed over the tree. If left too thick, it will not have room to swell: this frequently happens. If the tree be very strong, you may leave from three to six peaches on each shoot; according to the strength and length of the branch.

I have observed, that where the composition was applied to prevent the sap from being exhaled by the sun and air, all the trees that were very much loaded with fruit were not in the least hurt; while the trees that were treated in the common way were greatly injured, and often killed, when they have had a great crop.

In very dry seasons, it will be necessary to make a large bason round each tree; or, rather, make up an edge along the whole border with mould, as you would for a bed to bed out plants in a nursery; then give the trees a good watering, and mulch the border (which should be from two feet and a half to three feet broad) with some very rotten dung or leaves, which will keep the roots of the trees moist, and prevent the ground from cracking. Water the trees once a week during dry weather, and sprinkle the branches and leaves every other day in the afternoon, with the engine, pressing your fore-finger over the mouth of the pipe, in order to spread the water very fine. By these means you will keep the trees clean and free from insects; always remembering not to sprinkle them when the sun is on them, nor too late in the evening, as the former scorches the leaves, and the latter is apt to bring the mildew on the tender sort of peaches. If you find any of the trees infected, leave off sprinkling them, or water them with clear lime-water, as hereafter directed; but this should always be done in warm weather. By frequently sprinkling the trees with lime-water, and throwing it plentifully on the underside

of the leaves, where the Acarus, or Red Spider, is mostly found, you will in a short time extirpate that destructive insect*.

It is a bad practice to pick off the leaves of peaches. The shade of the leaves nourishes the fruit very much; and if you observe, wherever the leaves are picked off the fruit will be small, stunted, and ill-flavoured. Remember to hang up the bean-stalk (as hereafter described) before the fruit begins to ripen, in order to get rid of the earwigs, &c. otherwise they will greatly injure the peaches.—[*See the Chapter on Insects.*]†

I would recommend planting some trees of the early peaches in an East or a North aspect, for, by so doing, you will have a regular succession of fine peaches till the late sorts, to the South and West come in; but never plant late sorts to the North or East.

The following are the Sorts that I would recommend to be planted in North and East Aspects.

Early Avant, Early Ann, Early Mignonne, Roal George, Red Magdalen, Royal Kensington, Noblesse, Gross Mignonne, and Millet's Mignonne.

* The directions here given cannot possibly be observed in the management of large peach-orchards in America; but it will be no great difficulty or expence to observe them in gardens, where gentlemen set great value on their trees, particularly in Philadelphia, and other cities and towns.

† The American planter will not fail to profit from the directions given for the destruction of these noxious little vermin, which spoil both the appearance and the taste of no small part of every crop of his peaches.

CHAPTER IV.

OF NECTARINES.

A Description of Nectarines cultivated in England, and the Method of Planting, Pruning, and Training them.

THE Nectarine (properly so called from Nectar, the poetical drink of the Gods was introduced here about the year 1562, and belongs to the twelfth class of Linnæus.

This fruit differs from the peach in nothing more than in having a smooth rind, and the flesh being firmer†.

The Varieties which are cultivated in this Country are,

1. Fairchild's Early Nectarine. This is one of the earliest; it is a small round fruit, of a beautiful red colour, and well flavoured; and is ripe about the middle of August.

2. *Newington Nectarine. This is a fine fruit, of a beautiful red colour next the sun, and yellow on the other side. It has an excellent rich juice, and ripens about the middle of September.

3. The Elruge Nectarine is said to have been first cultivated by Gurle, a Nurseryman at Hoxton, in the time of Charles the Second. It is of a middle size, of a dark red or purple next the sun, and of a pale green on the other side. It has a soft melting pulp and vinous juice, and is ripe in the latter end of August, or beginning of September.

4. The Scarlet Nectarine is of a fine scarlet colour next the sun, but of a pale red next the wall. It ripens in the latter end of August, or beginning of September.

5. *Brugnun, or Italian Nectarine, is of deep red next the sun, and of a pale yellow on the other side; it has a rich flavour in a good year, and ripens in the latter end of August, or beginning of September.

6. *The Roman Red Nectarine is a large fruit, of a dark red colour next the sun, but of a yellow colour on the other side; and when full ripe it shrivels; the pulp is then replete with a rich juice. It is ripe in September....This nectarine has

† Those marked with an asterisk (*) adhere to the stone.

a smooth leaf, and the Newington a jagged one, which is one of the most essential differences by which these two excellent fruits are distinguishable from each other.

7. Murry Nectarine is of a reddish colour toward the sun, and of a pale green toward the wall. This fruit has a tolerably good flavour, and ripens about the middle of September.

8. Temple's Nectarine is of a middle size, of a pale red colour toward the sun, and of a yellowish cast next the wall. This fruit, when quite ripe, shrivels: the pulp is then full of rich juice of a fine flavour. It ripens about the middle of September, or beginning of October.

9. *Golden Nectarine. This is a handsome fruit of a soft red colour toward the sun, and yellow on the other side. It has a rich flavour, and is ripe about the beginning of October.

10. The Peterborough, or Late Green Nectarine (called also the Vermash), is of a middle size, round shape, and always of a green colour; the flesh is firm, and in a good season, tolerably well flavoured. It ripens about the middle of October.

11. The Violet Nectarine is of a middle size, and a purple colour next the sun, but pale on the other side; it has a vinous flavour, and ripens in the latter end of August, or beginning of September.

To the foregoing may be added:

Anderson's Nectarine,
Aromatic,
*Black Newington,
Clermont,
De la Taille,
*Early Pavie,
*Genoa,
Luncomb's Black,
*Musk Violet,
Newfoundland,
New White,
Princess Royal,
*Rogers's Seedling,
Royal Chair d'Or,
*St. Omer's,
Tawny, ripe in September,
White, ripe in August and September.

A Selection of Nectarines for a small Garden.

Fairchild's Early Nectarine, Elruge, Scarlet, Newington, Red Roman, and Murry.

Of the Management of Nectarines.

It is unnecessary to say much on this head, as the management of nectarines is almost the same as that of peaches.

The same rules must be observed with regard to pruning and cutting out diseased parts; and the same attention will be necessary during the summer; observing, in particular, not to leave the wood too thick.

On account of the smoothness of the skin of the nectarine, it suffers much more from millepedes (or wood-lice), earwigs, &c. than the peach; it will, therefore, be necessary to hang up a greater number of bundles of bean-stalks about these than about other fruit-trees. Wasps are also very destructive to nectarines, and the trees are very liable to be infested with the red spider; these are to be destroyed as hereafter directed. [*See the Chapter on Insects*].

Do not omit to thin the fruit when grown to a tolerable size; but never pick off the leaves till the fruit be full-grown; observing the rules already laid down for peaches. It will answer equally well with nectarines as with peaches, to plant some trees in an East aspect, which will continue the succession much longer than if all were planted in the usual aspects.

In the summer of 1800, which was dry and hot, we had a West aspect which was so much infested with the red spider that I expected the trees would have been totally destroyed. In February following, I had the wall well washed with soap and urine mixed, as also the stems and branches of the trees. (This must be done before the buds begin to open, and in the forepart of the day, that the trees may get dry before the evening; but never in frosty weather). Afterwards, wherever I saw any appearance of the spider, I watered the trees with clear lime water, as directed in chapters 3 and 28. These trees are now in a perfectly healthy state; but in some gardens where these precautions have been neglected, many of the trees are entirely killed.

CHAPTER V.

OF CHERRIES.

Different Sorts; and the Propagation, Planting, Pruning, and Training of them....How to preserve them from Insects.

CHERRIES are said to have come originally from Cerasus, a city of Pontus, from which Lucullus brought them after the Mithridatic war, into Italy. They so generally pleased there, and were so easily propagated in all climates into which the Romans extended their arms, that, within the space of a hundred years, they grew common as far as the Rhine, and were introduced into Britain about Ann. Dom. 55*.

Cherries belong to the twelfth class of Linnæus's System; Icosandria Monogynia.

A short Description of the principal Cherries cultivated in England.

1. The Small May Cherry is the first ripe, and requires a good wall. One or two trees of this kind may be sufficient for a large garden. It is ripe in June.

2. The May Duke comes in about the same time as the former, but is larger. It is an excellent cherry, and bears well against a wall.

3. The Archduke, if permitted to ripen properly, is an excellent Cherry. It is ripe in June and July.

4. The Hertfordshire Cherry is a sort of Heart, but firmer and of a finer flavour than Hearts in general. It does

*It is supposed by many, that Cherries were first introduced into this country in the reign of Henry the Eighth; but Lydgate, who wrote his poem called "Lickpenny", before the middle of the fifteenth century, or probably before the year 1415, mentions them in the following lines, as being commonly sold at that time by the hawkers in London streets:

"Hot pescode own began to cry,
"Straberys rype, and Cherryes in the ryse."

Ryce, rice, or ris, properly means a long branch; and the word is still used in that sense in the West of England.

not ripen till the latter end of July, or beginning of August, which renders it the more valuable, as it succeeds more early cherries.

5. The Bleeding Heart, or Gascoign's, is a very large cherry of a long form, and dark colour; it has a pleasant taste, and ripens in the latter end of July.

6. Harrison's Heart is a fine Cherry. It was introduced from the East Indies by Governor Harrison*, grandfather to the present Earl of Leicester, and first cultivated at his seat of Balls in Hertfordshire: Some of the trees, I am informed, he presented to George the First; and they are at this time in a flourishing state, bearing fine fruit, in Kensington Gardens. This Cherry is ripe in July and August.

7. The Black Heart is a fine Cherry, too well known to require description.

8. The Morello, or Milan Cherry, is a very fine fruit when kept till the month of October, and makes a very great addition to the dessert at that time of the year. This is the best Cherry that we have for preserving, and for making Cherry-Brandy.

9. The Carnation take its name from its colour, being red and white. It is a large round Cherry, but not so sweet as the Duke Cherry. It ripens in the latter end of July.

10. The yellow Spanish Cherry is of an oval shape and amber colour, and is a sweet pleasant fruit. It is ripe in August and September.

11. The Corone, or Coroun Cherry, resembles the Black Heart. This is an excellent fruit, and a good bearer. It ripens about the beginning of August.

12. The Lukeward comes in soon after the former, and is also a fine pleasant fruit, and a good bearer. It ripens in the beginning of August.

13. The Graffion. This is supposed by many to be the same with Harrison's Heart; but upon a close examination, I find it to be a different cherry: Its flesh is firmer and the stone flatter. It ripens in July and August.

14. Ronald's Large Black Heart Cherry, introduced into this country in the year 1794 from Circassia. Mr. Ronalds, nurseryman at Brentford, and the only person, to the best of my knowledge, who has cultivated it in England, sent me some of the fruit this summer, 1801. It is a fine large cher-

* Governor Harrison went out Governor of Fort St. George in December 1710, and returned home in 1719; and it is probable that he brought this cherry home with him; if so, some of these trees in Kensington Gardens must be upwards of eighty years old.

ry, a great bearer, and will, without doubt, be valuable as a forcing sort. This cherry, in my opinion, is well worth cultivating. It ripens in the beginning of July.

15. Fraser's Black Tartarian Cherry* is a fine large fruit.

16. Fraser's White Tartarian Cherry is white and transparent. These cherries are excellent bearers, but particularly the black kind: The fruit is of a fine brisk flavour, and they ripen early.

17. The Lundie Gean, cultivated at Lord Viscount Duncan's, near Dundee, is black, and almost as large as a Black-Heart Cherry. It is now common in the nurseries about Edinburgh; and Messrs. Gray and Wear have had it for some years in their nursery at Brompton-park.

18. The Transparent Gean is a small delicious fruit.

From the Black Cherry, which is supposed to be a native of England, are raised, by seeds, the black Coroun, and the Small Wild Cherry, of which there are two or three varieties, differing in the size and colour of their fruit. I would recommend planting these in parks and pleasure-grounds, as the trees grow to a great size, and have a beautiful appearance. The fruit will be food for birds, and so the means of preserving the finer fruit, in the garden and orchard, from their depredations. The wood also of these trees is very useful for turners and picture-frame makers. Stocks to graft upon are generally raised from the seed of this sort. These trees will thrive in poor land, where scarcely any other sorts will.

The Cluster Cherry is planted more for ornament, or curiosity, than for any other purpose.

To the above may be added:

Amber Heart,	Ox Heart,
Black Mazard,	Purple Heart,
Church-hills,	Red Heart,
Double-blossomed,	Spanish Black,

* The Tartarian Cherries were brought from Russia in the autumn of the year 1796, by Mr. John Fraser, of Sloane-square, Chelsea; well known for his indefatigable industry in collecting many curious plants, and other natural curiosities, in America and the West-Indies. He says, that these cherries are natives of the Crimea, and that he purchased them of a German, who cultivated them in a garden near St. Petersburg. This man had but few plants of them at that time, and sold them as a favour at ten roubles a plant. Mr. Fraser afterwards saw them in the Imperial gardens, where they were successfully forced in pots.

Flemish Heart,
Gross Goblet,
Holman's Duke,
Jeffrey's Royal,
Kensington Duke,
Large Spanish Cherry,
Late Large Morello,
Montmorency,
South's large Black,
Swedish Black Heart,
Tradescant's,
Turkey Heart,
Weeping,
Wentworth Heart,
White Heart.

Proper Kinds of Cherries for a small Garden.

The May Duke, the Large Duke Cherry, Archduke, the Black Heart, Harrison's Heart, Ox Heart, Turkey Heart, and Kensington Duke Cherry.

Planting, Pruning, and Training of Cherry-Trees.

In the choosing and planting of young cherry-trees, the same rules are to be observed as are given for Apricots, Peaches, and Nectarines; and they must in like manner be headed down the first year.

In pruning cherries, never shorten their shoots; for most of them produce their fruit at the extremities, the shortening, or cutting-off of which very frequently occasions the death of the shoot, at least of a great part of it. The branches, therefore, should be trained at full length. I have often seen the whole tree killed by injudicious pruning. Wherever the knife is applied, it is sure to bring on the gum, and afterwards the canker, which will inevitably kill the tree if no remedy be applied to the wounds.

I have headed down a great many cherry-trees which were almost past bearing, and so eaten up with the gum and canker, that what few cherries they bore upon old cankered spurs were not fit to be sent to the table.

In the years 1790 and 1791 I cut, or headed down, fifty trees. The operation was performed in the months of April and May (in May for America) in each year. These trees made shoots from three to five feet the same summer, bore fine cherries the next year, and have continued to bear good crops ever since.

To the above trees I applied the composition. At the same time I cut down twelve trees in the same row, but did not apply the composition: These twelve trees all died in the second and third years after. We now gather more cherries from one tree where the composition was applied, than we did from the whole number formerly; being also much finer and larger fruit.

When Cherry-trees are very old, and much injured by large limbs having been cut or blown off (which will infallibly bring on the canker and gum, and, if no remedy be applied, in a short time kill the trees); or if there are great spurs left standing a foot perhaps from the branch [*See Plate* 4. *Fig.* 2.]; the best way to bring them to have fine heads, and to fill the vacant space, is to head them down as low as possible, taking care to leave some small shoots, if there are any; if not, leave a bud or two at the ends of some of the shoots. Sometimes you will have a great difficulty to find any buds. If that be the case, in the spring, before you mean to head the trees, make some incisions in the branches. [*See Plate* 9.] This should be done on different branches, at the most convenient places for filling the tree with good wood. The size of the incisions should be from one to two inches, according to the largeness of the branches; observing to make them just above the joint where the buds should come out. If you cut just below a joint, the shoot will die as far as the next bud or joint; and, of course, injure the tree, if no remedy be applied.

The time for performing this operation is in March, April, or May. (In America, April will be the best month). The above method of making incisions is only recommended where there are no young shoots or buds, and when the tree is in the last stage of the canker.

Where you have a few young shoots, or buds, cut down the head as near to them as you can, and take great care to cut out the canker till you come to the sound bark. The canker makes its appearance in cherry-trees in the same manner as it does in peach and nectarine trees, and may be easily discovered by an attentive observer. If any gum remains, it must be cut or scraped off: The best time for doing this is when it is moistened with rain; you can then scrape it off easily without bruising the bark. This operation is very necessary; and if it be neglected, the disease will increase rapidly.

Wherever the bark or branches have been cut off, the edges should be rounded, and the composition applied.

The general way of pruning cherry-trees has been to leave great spurs, which continue to increase till they become as thick as a man's arm: But be it observed, that cutting off, from year to year, the shoots that are produced from the spurs, increases the canker, till large protuberances, like wens, are formed on the branches, becoming very unsightly; and these occasion them to produce only small and ill-flavoured fruit, at a great distance from each other [*See Plate* 4. *Fig.* 2]. When this is the case, the method I pursue is, to head the trees down as before directed.

If the young shoots are properly trained, they will produce fruit the following year; and in the the second year they will produce more and finer fruit than a young tree that has been planted ten or twelve years.

It has been a general complaint, that Heart Cherries are bad bearers when trained up as wall-trees; but, by pruning them as Duke Cherries, I have brought them to bear in the same manner.

Never make use of the knife in summer*, if it be possible to avoid it, as the shoots die from the place where they are cut, leaving ugly dead stubs, which will infallibly bring on the canker. These shoots may be cut in the spring to about a couple of eyes, as Duke Cherries, which will form a number of flower-buds, as appears in *Plate* 4. *Fig.* 1. *Fig.* 2, is an old branch, to shew the manner in which the spurs are formed whem the old method of pruning is followed, and the barren unproductive state of the tree†.

When cherry-trees begin to produce spurs, cut out every other shoot to make the tree throw out fresh wood: When that comes into a bearing state, which will be in the following year, cut out the old branches that remain; by that method you will be able to keep the trees in a constant state of bearing, taking the same method as before directed with the fore-right shoots.

Great care should be taken to rub off many of them in the month of May, (middle of June, for America) leaving only such a number as you think will fill the tree. By so doing your trees will continue in a fine healthy state, and not be in the least weakened by bearing a plentiful crop of fruit. The reason is obvious, the great exhalation which would be occasioned by the sun and air in the common mode of pruning is prevented, by the composition keeping in the sap which nourishes the branches and fruit.

I cut some trees, as directed above, more than twelve years ago, that are now in as good a state of bearing as they were in the third year after the operation, and likely to continue so for many years.

* As Morello Cherries bear their fruit on the second year's wood, from two to five in a cluster, and not on spurs as other cherries do, the strongest and cleanest wood should be left at full length in the summer, and all superfluous shoots be rubbed off.

† At Ashted-Park, the seat of Richard Bagot Howard, Esq. near Epsom, there is a cherry-tree between fifty and sixty feet high; and, at four feet from the ground, nine feet six inches in circumference. This tree, with many others of the same kind, was planted several years after the chesnuts, mentioned in chapter 20.

In 1797, I pruned some very old trees in the month of May, which were left, to shew the old method of pruning; I, at the same time cut some branches off the same trees according to the new method, to shew the difference of the fruit, which was taken by all who saw it for a different sort of cherry. The cherries from the old spurs were not half the size of the others, and were at least three weeks later.

I am sorry to say, that many who have seen the improved state of the fruit-trees in Kensington Gardens still have their own managed according to the old method of pruning. Several, however, have adopted the new method with great success. One gentleman in this neighbourhood, by renovating thirty-nine Old Morellos planted on a North wall 176 yards long, and ten feet high, was in a few years able to sell yearly, on an average, from thirty to forty pounds worth of fruit produced from them, besides supplying his own family. In some years the Market-Gardener who sold them allowed him three shillings per pound weight.

A row of Dwarf Cherry-trees that stood against an old paling in Kensington Gardens, with an old thorn hedge at the back of it, (which every year so infected them with a blight accompanied with an immense number of caterpillars and other insects, that even in a fine year we could not gather eight baskets from the whole row) became so fruitful after the hedge and paling were removed, that we gathered forty-two pounds a-day for six successive weeks, beside what the birds, wasps, and flies destroyed.

This estimate is within the bounds of truth; and I mention the fact to stimulate Market-Gardeners and Farmers, who have large orchards and gardens, to exert themselves in trying every method, however unimportant it may at first appear, to improve and render them more fruitful.

The Duke and Heart Cherries from these trees were as fine as any that were produced from wall-trees; and as they are much more productive, I have been induced to take up many of the old renovated trees from the walls, and plant them out for dwarf standards, supplying their places with pears, plums, peaches, &c.

In all old gardens and orchards throughout the kingdom, and particularly in Kent, whence the London Markets are chiefly supplied with apples and cherries, the greater part of the old trees will hardly bear fruit sufficient to pay the expence of gathering it; but if the above method of pruning, &c. were practised, the owner would soon find his account in it, and be amply repaid for his trouble: The fruit will be much finer,

and would have five times the quantity that the trees produce in their present condition; the trees would be more sightly, and always keep in a flourishing and bearing state*.

When old Standard Cherry-trees become decayed and hollow, I would recommend heading them down, as directed for wall-trees and dwarfs. Scoop out all the rotten, loose, and decayed parts of the trunk, till you come to the solid wood, leaving the surface smooth; then use the composition as hereafter directed.

* I do conjure the American planter to pay attention to the facts and reasons here advanced. He may rest assured, that, if he follows the directions here laid down, he will open to himself a new source of pleasure and of profit. The increased *quantity* of the fruit is not so material, in cherries, as the increase in the *size* and in the *richness of the flavour*. In this respect the method of pruning, here laid down, is invaluable.

CHAPTER VI.

OF APPLES.

Different Sorts of Apples described....Of Heading Apple trees.... Of Espaliers and Dwarfs....Grafting Old Apple Trees; and of the Advantage of using the Composition in that Operation.

LINNÆUS has joined the Pear, the Apple, and the Quince together, making them all of the same genus, and has reduced all the varieties of each to one species. They belongto the twelfth class, Icosandria Pentagynia.

The Species are,

1. The Wild Apple with a very sour fruit, commonly called Crab.
2. Wild Crab of Virginia, with a sweet-scented flower.
3. The Dwarf Apple, which is rather a shrub than a tree; commonly called Paradise Apple.

I shall give a List of the best Apples that have been introduced from France.

1. The Rambour is a large fruit, of a fine red next the sun, and striped with a yellowish green. It ripens about the middle of September.
2. The Corpendu, or Hanging Body. This is a very large apple, and has a red cast on the side towards the sun, but is pale on the other. It takes its name from always hanging downwards; and ripens in September.
3. The White, or French Rennet, is a lare fruit of a yellowish green colour, with some grey spots. It has a sugary juice, and is good either for eating or baking.
4. The Rennette-Grise is a middle-sized fruit, of a grey colour next the sun: It is a very good juicy apple, of a quick flavour, and ripens about the latter end of October.
5. Pomme d'Api is much valued for its colour, being of a bright red. The tree is a good bearer, and the fruit is not

subject to be shaken by high winds. This fruit should be suffered to hang on the tree till October or November, if the frost do not set in. It comes into eating in February and March, and keeps long; but is more admired for its beauty than its flavour.

6. Le Calville d'Automne, the Autumn Calville. This is a large fruit, of an oblong figure, and of a fine red colour towards the sun. The juice is vinous, and much esteemed by the French.

7. Fenouillat, ou Pomme d'Anis, the Fennel or Anise Apple, is a middle-sized fruit, of a grey colour; the pulp is tender, and has a spicy taste like anise-seed. It ripens in September, October, &c.

8. Pomme Violette, the Violet Apple, is a pretty large fruit, of a pale green, striped with a deep red towards the sun. It has a sugary juice, and a flavour of violets, from which it takes its name. It ripens in October, and continues in eating till February.

The sorts above mentioned are what have been introduced from France; but there are not above two or three of them that are much esteemed in England, viz. the French Rennet, the Rennette-Grise, and the Violet Apple; the others are mentioned for the convenience of those who wish to have a great variety.

I shall now give a List of those Sorts of Apples which are most esteemed in England.

9. The Juneting, or Jenneting, is a small yellowish apple, red on one side. It is a pretty fruit for early variety, and ripens about the latter end of June and beginning of July.

10. The Codlin is generally the first apple that is brought to market. This fruit is so well known, that it needs no description. It is in eating from July to December, and is good either for baking or boiling.

11. The Margaret Apple is a fine and beautiful fruit, yellow striped with red, of a delicate taste, sweet scent, and is generally eaten off the tree. It is ripe in August.

12. The Summer Pearmain is striped with red next the sun; the flesh is soft, but soon turns mealy; so that it is not much esteemed. It ripens in August and September.

13. The Kentish Fill-Basket is a species of Codlin, of a large size, and is generally used for baking. It is in eating from August to October.

14. The Transparent Apple was introduced from St. Petersburg; but is more curious than useful; a tree or two, therefore, will be sufficient for a garden. It ripens in September and October.

15. Loan's Pearmain is a beautiful fruit; the side next the sun is of a fine red, and the other side striped with the same colour: the flesh has a vinous taste, but soon grows mealy, which lessens its value. It ripens in September and October.

16. The Quince Apple is seldom larger than the Golden Pippin, and the side next the sun is of a russet colour. This is an excellent apple for about three weeks or a month, and ripens in September.

17. The Nonsuch is a good bearer, and very fit either for the table or kitchen; the cooks however complain that it makes but a very small proportion of sauce. It is ripe in September and October.

18. The Golden Rennet is too well known to need any description; it ripens about Michaelmas, and will continue good a month.

19. The Aromatic Pippin is a very good apple, of a bright russet next the sun; and the flesh has a fine aromatic flavour. It ripens in October.

20. The Herefordshire Pearmain, or Winter Pearmain, is of a fine red next the sun, and striped with red on the other side; the flesh is juicy and stews well. It is fit for use in November and December.

21. The Kentish Pippin is a handsome fruit, of a pale green colour, and the flesh full of a quick acid juice. This is a good kitchen fruit; it ripens in November and will keep till February.

22. The Holland Pippin. This fruit is larger than the former, the colour darker, and the flesh juicy. It ripens in October, and will keep long, and is a good kitchen apple.

23. The Monstrous Rennet is a very large apple, turning red towards the sun, and of a dark green on the other side. It is generally preserved on account of its magnitude, as the flesh is apt to be mealy. It ripens in October.

24. The Embroidered Apple is pretty large and the stripes of red very broad, from which circumstance it takes its name. It is commonly used as a kitchen apple, and is ripe in October.

25. The Royal Russet, or Leather Coat Russet is a large fruit, and one of the best kitchen apples that we have. It is also a pleasant eating apple, and a great bearer; and is in use from October to April.

26. Wheeler's Russet is of a middling size, the flesh firm and of a quick acid flavour; it is an excellent kitchen fruit, and will keep long. It ripens in October.

27. Pile's Russet is a very firm fruit, of a sharp acid flavour, but is much esteemed for baking. It ripens in October, and will keep till April.

28. The Nonpareil is a fruit deservedly valued for the briskness of its taste. It is seldom ripe before Christmas, and if well preserved, will keep till May. This is justly esteemed one of the best apples that have been yet known.

29. The Golden Pippin is well known; and the French own it to be of English origin. It is almost peculiar to England; for there are few countries abroad where it succeeds well. It is yellow as gold; the juice is very sweet; the skin (especially where exposed to the sun) is often freckled with dark yellow spots. It is certainly the most antient as well as the most excellent apple that we have. It ripens in October, and will keep through the winter. There are several varieties of this fruit.

30. The Pomroy, or King's Apple, ripens nearly as soon as the Juneting; and though not so beautifully coloured, is larger and much better tasted.

31. The Red and White Calville are good apples, of a vinous taste. Some have a red, and some a white pulp; and the white is reckoned of a most delicious taste. They are in eating in September and October.

32. The Kirton, or Cracked Pippin, is a good apple for the table. It ripens in September and October.

33. The Ribston Pippin* is a fine apple from Ribston Hall, near Knaresborough in Yorkshire. It is a little streaked with red towards the sun, and yellow on the other side. It is one of the best apples for eating and baking, and continues in use from the end of October till April. It bears very well as a dwarf, and no garden should be without it.

34. The Margill is an excellent apple, and continues in use from November till the latter end of March. It is often sold in the London Markets for a Nonpareil.

35. Kirk's Scarlet Admirable, a good apple for baking, and of a beautiful scarlet colour, is in eating about the month of January.

36. The French Crab is good for baking; and, when it is a favourable season, will make a pretty good show at the table.

* The first tree of this sort was found growing in Sir Harry Goodrick's Park.

It keeps the longest of any apple that we know, being in eating from April to Christmas.

37. The Pomme Gree*, a fine apple from Canada, is of a flattish form, and russet colour, streaked beautifully with red. It ripens late and keeps till March.

38. Sykehouse Russet, a fine eating apple, from Sykehouse, in Yorkshire.

39. The Godolphin Apple is a very handsome large fine fruit, streaked with red on the side next the sun, and of a yellowish colour on the other side. It is in eating from the latter end of September to December. I found this apple growing in the garden of the late Lord Godolphin, in St. James's Park; and have given it the name of the Godolphin Apple, as I have not been able to find it in any catalogue.

40. Pearson's Pippin is a nice apple, about the size of a large Golden Pippin, of a yellowish colour, and the form a little flat. In Devonshire, they put these pippins into the oven just after the bread is drawn, laying a weight over them to flatten them, in the same manner as they do the Beefin in Norfolk, and bring them to table as a sweetmeat. I brought some cuttings of this tree from Nutwell near Exeter, which I grafted on some trees in Kensington Gardens.

41. The New-Town Pippin is a fine apple in a good season; but seldom ripens with us. It is held in great esteem in America.

42. Fearn's Pippin is of the shape and size of a Nonpareil. It is of a beautiful scarlet colour next the sun, and of a golden yellow on the other side. It makes a fine show at table, and will keep till the latter end of February.

43. Hay's Fine Large Baking Apple.

44. Queen's Apple is a beautiful fruit, red towards the sun, and of a fine yellow on the other side. This is a very fine apple; in my opinion, next in perfection to the Golden Pippin, and about the same size. It is in eating from November to the end of March.

The above are the best apples that have come to my knowledge; but, for the convenience of those who are fond of great variety, I shall add a few, with their characters, from the catalogue of Messrs. Anderson, Leslie and Co. Nurserymen at Edinburgh; and also a list collected from the cata-

* The Pomme Gree was introduced into this country by Mr. Alexander Barclay, of Brompton, well known for his ingenuity in bleaching of wax. He is a great lover of horticulture, and has raised several new sorts of gooseberries from seed.

logues of the most eminent Nurserymen in the neighbourhood of London, and other parts of England.

Van Pippin, first ripe, little flavour, of Dutch origin.

Orzelon Pippin, a small early yellow apple.

Gogar, or Stone Pippin, good, and will keep till May.

Whitemore Pippin.

Paradise Pippin, a beautiful long apple, but soon grows mealy.

Thorle Pippin, a pretty flat early apple of great beauty.

Orange Pippin.

Dalmahoy Pippin.

Hamilton Pippin, good.

Bridgewater Pippin, for kitchen use.

Carberry Pippin, very good.

Lisbon Pippin.

Commissary Pippin.

Grafton Pippin, an Irish dessert apple, and much recommended.

Lufness Pippin.

Balgown Pippin, is a true Golden Pippin; but by soil and culture rendered larger.

Scarlet Rennet, beautiful, but does not keep long.

Striped Nonpareil, a new fruit, the wood of which is striped.

Dutch Pearmain.

Royal Pearmain, a beautiful large apple.

German Pearmain.

White Pearmain.

Summer Leadington. The Leadingtons are all of Scotch production, and excellent baking apples; but are soon apt to spoil, except the Grey.

Large Stoup Leadington.

Scarlet Leadington.

White Leadington.

Grey Leadington. This is among the best of our Scotch Apples, and keeps well, but of little beauty.

Royal Codlin, a large fine fruit.

Carlisle Codlin, much esteemed in the North of England for baking.

Summer Queening.

Winter Queening.

Summer Teuchet Egg, a small early Clydesdale Apple, of a reddish yellow colour.

Winter Teuchet Egg.

Sweener's July-Flower, good.

Ephrow, or Lady Apple, a very good keeping apple.
Rose Apple, or Greater Api, a French Apple, of sweet taste and great beauty.
Wine Apple, one of the best Scotch Autumn Apples.
Golden Monday, or Pear Russet, good and beautiful.
Yorkshire Green, for baking.
Strawberry, very good.
Summer Marygold.
Fulwood, keeps long, fit only for baking.
Lady Wemyss.
Pursemouth, well flavoured, but dry; a fine orchard apple.
Naked Apple, very good and keeps long; a Clydesdale Apple.
Red Ruby, an orchard apple.
Jerusalem Apple, is red all over, and has a firm pulp, but little taste.
Queen of England.
Dutchess of Hamilton.
Salmon Apple, bright red and yellow colour, brisk juice, and keeps many months.
Whistleberry, very good.
Harvey Apple, from Cambridgeshire.
White Apple of Hawthornden, an orchard apple.
Carse of Gowrie, do.
Long Apple of Garron, do.
Winter Eli, do.
Summer Eli, do.
Pigeon Apple, or Pigionette, a French dessert apple.
Tower of Glammis, an orchard apple.
White Apple of Moncrieff, do.
Patridge Apple, a good sort for kitchen use.

Those in the following List marked thus, are most esteemed for eating raw; those†, for baking or boiling; and those‡, for making of Cyder. The Words in Italick are names by which the preceding Fruit is frequently known.*

*Acklam's Russet,
Aged Pippin,
Aromatic Broading,
Summer Broading,
Autumn Pearmain,
†Barcelona Pearmain,
†Baxter's Pearmain,
†Beaufin,
Lincolnshire Beaufin,
Yorkshire Beaufin,
Norfolk Beaufin,
Beauty of Kent,
Belle Gridelin,
Best Pool,

Black Pippin,
‡Black Moor,
Bontradue,
Braddock's Seek no further,
†Cat's Head,
*Cawood Timely,
*Chardin's Sans-pareil,
Chester Pearmain,
‡Cockajee or Coccagee,
†Costard,
Cotton Pippin,
Covadies,
Darling Pippin,
Derbyshire Crab,
Devonshire Buckland,
Double-blossom Scarlet Crab,
Dowsen's,
Dutch Paradise,
*Early Nonpareil,
‡Everlasting Hanger,
†Eyer's Greening,
‡Fox Whelp's,
Frank Rambour,
Frazer's,
French Pippin,
French Paradise,
‡Gennet Moyle,
Golden Doucet,
Golden Mundi,
Golden Noble,
Golden Lustre,
*Golden Pearmain,
Golden Russet,
Grey Noble,
Gray's Pippin,
†Green Blundrel,
†Green Pearmain,
Hall Door,
Havers's Monster,
‡Hertfordshire Under-leaf,
Hollow-crowned Pippin,
*Hubbard's Pearmain,
Russet Pearmain,
Hughes's New Golden Pippin,
‡John,
Deux Ann,
July-Flower,
June Keeping,
Kipling's Pippin,
King of the Pippins,
Kirke's Incomparable,
†Kitchen Rennet,
Lady's Finger,
†Lancashire Housewife,
Large Yellow Pippin,
*Large Golden Pippin,
Baker's Golden Pippin,
Large Apple Williamson,
Lawman's,
Lemon Pippin,
†Lincolnshire Rennet,
London Pippin,
Five Crowned Pippin,
Lord Islay's Pippin,
Mansfield Tart,
†Minehall,
Neal's Summer Kentish,
New York Pippin,
New England Pippin,
Norfolk Paradise,
Norfolk Storing,
Nutmeg,
Old Pearmain,
Orgeline, or Orjeline,
Oxford Oak Peg,
Oaken Pin,
*Oxhead Pearmain,
Earl of Yarmouth's Pearmain,
Pie Pie,
Pine-Apple Russet,
Pipy Russet,
*Pomphilia,
Queen's,
Queen's Pearmain,
Red-fleshed Beaufin,
Red Streak,
Red Vacan,
Ronald's Queen Charlotte,
†Robine,
‡Royal Wilding,

Scarlet Pearmain,
Sheppard's Russet,
Siberian Crab,
Sir Charles Wagers,
Skerm's Kernel,
Spencer's Pippin,
Spice Apple,
Spit,
Stout Buckland,
†Striped Beaufin,
Stubbard,
‡Styre,
‡Summer Redstreak,
Summer Pippin,
Summer Russet,
†Summer Colman,
Summer Majetin,
Tankard Apple,
Ten Shillings,
Tom Two Years Old,
†Transparent Codlin,
Virgin,
*White Pippin,
White Sour,
Welch Lemon Pippin,
Whykins's Pippin,
Wine Sop,
‡Winter Redstreak,
†Winter Colman,
†Winter Broading,
Winter Majetin,
‡Woodcock's,
Yellow Buckland.

N. B. The Siberian Crab and the Double blossom Crab are good for preserving.

Sorts of Apples proper for a small Garden.

The Juneting, Golden Pippins, Nonesuch, Ribstone Pippin, Nonpareils, Queen's Apple, Sykehouse, Golden Rennet, Aromatic Pippin, Grey Leadington, Scarlet Pearmain, Lemon Pippin, Pomme Gree, and French Crab, different sorts of Russetins and Codlins, for baking.

I have taken all the pains that I could to ascertain the real names of the best apples; but the varieties are almost infinite: It is, therefore hoped, that if the same apple should in some few instances be found under different names, it being almost impossible, amid such a variety, to avoid a mistake of that kind, the candid reader will have the goodness to view it with indulgence.

On the Choosing, Planting, Pruning, and Training, of Apple-Trees.

In choosing Apple-trees from the Nursery, it may be sufficient to observe, that they, as well as Apricot and Peach-trees, should have strong, straight, and clean stems.

Sufficient instructions have already been given for preparing the borders* and planting the trees; which will also be applicable here. The same directions for heading must be observed, according to the season and time of the buds breaking forth, leaving the number according to the strength of each tree; cutting as close as possible to the top bud, that the leading shoot may the more easily cover the wound; and constantly observing to rub off all the buds that come up by the side of the leading shoot, which would otherwise rob it of its nourishment and strength, and so prevent it from making a fine leader. [*See Plate* 6, *Fig.* 1.] Remember to cut it annually to the length of from nine to eighteen inches, according to its strength, till the tree is got to that height to which you would have it run, and according to the extent of the ground; which height may be from eight to twelve feet. By these means the trees will throw out horizontal branches on every side, and soon form handsome heads for Dwarfs.

I would advice not to suffer the Dwarf-trees to run higher than twelve feet; otherwise they will become naked at bottom, the fruit will be liable to be blown down, and the tops broken by high winds.

In heading old decayed apple-trees, for the sake of symmetry, it will be necessary to cut at the forked branches as near as can be to the upper side of the fork, cutting them in a sloping manner to carry off the wet, at the same time rounding the edges. You may begin at the lower branches, cutting just above the lower fork; and, proceeding upwards, cut the rest of the branches from one to six joints, or forks, according to their strength, till you have finished cutting-in the whole head. If any of these branches should have the canker, all the infected part must be cut out. When the tree is all prepared, apply the composition immediately, beginning at the top of the tree, and finishing with the powder of wood-ashes and burnt bones, as you descend; which will prevent it from being rubbed off during the operation; and the composition will prevent the sun and air from injuring the naked inner bark. A tree thus prepared will, in the course of three or four years, produce more and finer fruit

* He is here speaking of the grounds for Dwarf-Apples, in gardens; but, nearly the same rules will apply to others. He treats of orchards hereafter, though he may not, perhaps, repeat all the directions, which are common to all apple-trees, in all forms and situations.

than a maiden tree that has been planted upwards of twenty years.*

It is hoped that the above directions, if properly attended to, will be sufficient to enable any one to bring old decayed trees into a healthy bearing state.

In large orchards and gardens, it may be necessary, at first, to head down only every other tree; cutting some of the branches of the rest, which are in a decayed and cankery state and will bear no fruit. This will be preparing them to throw out new wood and furnish, the tree much sooner with bearing branches. In such a season as the present (1800), when there is a blight and general failure of crop throughout the kingdom, the operation may be performed in summer, in the months of May, June, and July, (May for America) and even so late as August, which would save a season. I would, however, recommend the performing the operation as early as possible; for by so doing the wood will be the stonger.

When the trees are become hollow, the like method should be followed as is directed for plums; but by no means cut them down unless the tops are quite decayed; observing to cut the loose rotten wood clean out of the hollow and other decayed parts, applying the composition. At the same time remember to open the ground, and cut out all the rotten parts that may be found in the lower part of the stem, together with all the decayed roots, which, if this be not done, will infallibly injure the fresh wood and bark, and prevent a cure from being effected.

I would recommend heading down all apple trees that are much cankered and have ill-shaped heads; for by so doing much labour will be saved, and the trees will amply pay the proprietor.

Never shorten the young branches, except they are very thin, when it will be necessary to do so to fill the trees with young wood; nor prune any of the young shoots the second year (I mean the year after they are cut), as many of the eyes, almost to the end of the shoot, will, if it be strong, become fruit-buds next year; and so on every year.

In the month of May in the first year after the trees have been so cut, it will be necessary to go over them, and rub off,

* Upon reading this paragraph, how many American orchards present themselves to my view! How many orchards have I seen, without a single apple, while, with the help of this operation would soon be loaded with fruit! How soon are trees in that country regarded as worn out, and are, as such, cut down, which trees by the aid of this system would last for twenty or forty years longer, and would be infinitely preferable to a young orchard, besides the advantage which would be derived from preventing the loss of time.

with your finger and thumb, all the superfluous young shoots; leaving from three to six eyes on each shoot, according to the size and strength of the branch cut. These shoots will bear from three to four years; by which time they will be pretty much exhausted by the great quantity of fruit produced from them; they should then be cut down to two eyes to produce new wood.

I always leave three different years' branches on the tree, when the first shoot *d*, is cut off at *e*. [*See Plate* 6. *Fig.* 2.] You will observe the next shoot *f*, to be full of fruit-buds, if it has not been shortened; when it begins to grow weak, cut it off at *g*. The next cutting must be at *i*, when the branch *h* is tired of bearing. Proceed thus all over the tree with care and attention, and you will soon perceive the advantages of this method of pruning above the the common mode; for by it you will be able to keep your trees in a constant state of bearing, which if left to nature, would only produce a crop of fruit once in two or three years*. Always remember, when the shoot that has done bearing is cut off, to apply the composition immediately, and to rub off the shoots where they are too numerous.

The best time to prune apple-trees is in the month of April, or in May, after the peaches, nectarines, and cherries are pruned†.

The small shoots that cross each other should be cut off, leaving the strongest to fill up the tree, and make a fine handsome head. The suckers that spring from the root should be carefully grubbed up, and the side-shoots from the stem cut off; for, if left to grow, they will greatly weaken the tree. The knobs, where old branches have been cut off, should also be pared away, leaving the surface of the tree as smooth as possible; then apply the composition; the young bark will soon begin to grow, and by degrees cover the old wounds with a

* This is the cause of the frequent failure in crops, and not any perverseness in the stars, as the old women imagine. Mr. Forsyth's trees never fail. His trees, of all sorts were full of fruit, while it seemed in other gardens, to be a matter of chance.

† Soon after this pruning, about the middle of May (same time for America) it will be proper to look over the trees, and to pick off any caterpillars that may be on them.

You will then see what shoots are infected with the canker, and which might have escaped your notice at the time of pruning; and, wherever you observe the least appearance of infection, which may be known by the wood appearing of a brownish colour, the shoot must be cut down till you come to the sound white wood.

fresh smooth surface, and thus prevent the canker from gaining ground on the tree. I have seen some old wounds of considerable size healed over in one year.

The trees which I pruned and dressed, as above directed, in the course of the summer 1795, are all perfectly cured, the wounds being filled up with sound wood, and covered over with new bark: They all continue in a healthy state, and bear fine handsome fruit.

I have advised several Nurserymen about London, particularly Messrs. Gray and Wear at Brompton Park Nursery, Kensington Gore, and the late Mr. Malcolm of Stockwell, to head down their apple-trees after the season of drawing for sale is over.

Messrs. Gray and Wear have headed a great many of such trees as were formerly thrown to the faggot-pile, and have been amply recompensed for their trouble. Trees thus headed down, provided the stems be strong, will, in the first and second year, produce as much fruit as will refund the purchase-money; besides, a great deal of time will be saved, which would be lost by planting younger trees.

If you can procure trees of the above description that have been headed down three or more years, they will be all covered with fruit-buds, and, if carefully taken up and planted in the autumn, if the season proves favourable, you will have a tolerable crop of fruit the first year. Such trees must not be headed-down like maiden-trees, but only thinned off where the branches run across and rub against one another, which should never be suffered.

From what has been said, I hope that gentlemen and others will not be blind to their own interest; but that they will give the practice a fair trial, which, if properly executed, will not fail to turn out to their satisfaction. Independent of the great advantage to be derived from the increase of crops, instead of decayed, moss-grown trees, bearing only a few small hard and kernelly fruit, they will have the pleasure of seeing fine healthy clean trees loaded with large beautiful and well-flavoured fruit; which, to those who have a taste for gardening and rural affairs, will be no small consideration.

The borders where you make your crossings in gardens should be six or eight feet broad at least, to let the trees spread on each side, at the distance of twelve feet from tree to tree, and they should be well trenched, two feet and a half deep at least. If there should be gravel, or sour clay, it must be taken out, and good mould put in its place; leaving the ground as rough as possible, for the frost and rain to mellow

it. When you level the ground, it should be done after rain; you may then sow some small crops in the borders, such as Lettuce or Spinage, or Cabbage for transplanting; but let not any of the Brassica tribe come to full growth. Leaving Cabbage and Broccoli on borders, near fruit-trees, draws the ground very much, fills the borders with insects, and also prevents the sun and air from penetrating into the ground.

When the sun can have free access to the border, it adds much to the flavour of the fruit. If you can spare the ground on the cross-borders in winter, it will be of great service to the trees to ridge it up as loose as you can, and let it lie in that state all winter, to mellow and sweeten.

If the soil be strong, I would recommend planting of apple-trees that are grafted on Paradise Stocks; but if the soil be light, Free Stocks will do much better.

When the ground is a strong clay or brick earth, mix it with old lime-rubbish or coal-ashes, street-dung or sand; but what I use for the borders against the walls, and which I prefer to every other manure, is a vegetable mould produced from leaves of trees, which may be obtained in the following manner:

Collect annually as many loads of leaves as you conveniently can, which make up into hot-beads for late melons and cucumbers, and for early potatoes, &c. First plant the beds with early potatoes; at the same time sow radish and lettuce seeds mixed together. When the radishes are pulled, thin the lettuces, leaving a sufficient quantity for a crop; by the time the lettuces are fit for cutting, the potatoes begin to cover the bed. After the lettuces are all cut, you should put some of the leaf-mould close up to the stems of the potatoes, which will run very fast into the fresh manure, and produce a fine early crop. When you have dug up the potatoes, take off all the fine vegetable mould till you come to the leaves that are not yet rotten; then with a fork turn up the leaves, adding some fresh leaves at the same time, which will cause a fresh heat to come up in the bed; when this is done, put on the lights and keep them close for three or four days: If the weather be fine and clear, there will, by that time, be a fine sweet gentle heat*.

You may then sow or plant melons or cucumbers in the beds.

* What is here said about the use of leaves in the course of their rotting is not altogether applicable to America; but it will be very useful for the American planter to know, that rotten leaves are so useful, as he can always get enough of them. Nor would hot-beads of leaves be altogether useless in America for spring lettuces, cucumbers, radishes, &c. &c.

When the heat begins to decline, and the fruit to swell, put a fresh lining of leaves, two feet and a half broad, round the beds. The beds may be broken up the second winter; by which time you will find the top part of them rotted to a fine black vegetable mould, which will be the best manure for trees.

A good coat of this manure once in two or three years will be sufficient for the borders where the wall-trees stand, and much better than dung, which I by no means approve of for trees, unless it be perfectly rotten and mixed up with mould.

Some of the leaves will be found not quite rotten at the bottom of the beds; these may be mixed up with fresh dry leaves from the park, garden, &c. and used for making new beds.

Of Grafting old Apple-Trees.

It frequently happens, that, through some mistake or other, after waiting ten or twelve years for a tree to come into a bearing state, it is then found that the fruit is neither fit for the table nor kitchen; in such case, we always graft them the following spring, observing to graft on the finest and healthiest shoots, and as near as possible to the old graft, and where the cross shoots break out; by so doing, you will have some fruit the second year; and in the third, if properly managed, you will have as much as on a maiden-tree of fifteen years standing*.

The canker, if any, must be carefully pared off the branch, and the scion must be taken from a sound healthy tree.

Whenever an incision is made for budding or grafting, from that moment the canker begins. I would, therefore, recommend to those employed in budding or grafting, as soon as the incision is made, and the bud or graft inserted, to rub in with the finger, or a brush, some of the composition before the bass is tied on; then cover the bass† all over with the composition as thick as it can be laid on with a brush, working it well in. If this operation be performed in a proper manner, and in a moist season, it will answer every purpose, without applying any grafting clay.

This I have frequently done, and found it succeed perfectly to my wishes. Observe, not to slacken too soon the

* This rule must be of great use, and I find it to have been practised with great success at Kensington.

† *Bass* is the stuff of which are made the *mats* that are put round trunks, &c. in the shipping of goods. It is a nice soft ligament, and is much better than any other, as it never resists the swelling of the wood.

matting (or bass) which is wrapped round the bud; for in that case you will find the incision opened, which very often occasions the death of the bud.

If Nurserymen and Gardeners would give this method a fair trial, and use the same composition as I use for curing defects in trees, instead of loam and horse-dung (which binds so hard as to prevent the rain and moisture from penetrating to the graft to moisten the wood and bark), they would find that the grafts would succeed much better. The composition, for this purpose, should be rather softer than grafting-clay generally is; and instead of aplying so large a mass as is generally done of clay, it need not, in most cases, be more than two or three inches in circumference.

CHAPTER VII.

OF PEARS.

Different Sorts of Pears described.....Of Planting, Heading, Pruning, &c.....Experiments on old Trees.....A comparative Statement of the Produce of Pear-Trees, by the old and new way of Pruning and Training.....Of Trees headed down..... Remedy for the Canker, &c.

THE cultivation of the Pear is, undoubtedly, of considerable antiquity; for Pliny mentions no less than twenty kinds, and Virgil five or six.

Linnæus arranges pears in the fourth section of his twelfth class, along with apples and quinces.

The pear-tree comprehends several varieties, ripening in successive order from July to October.

The Pears commonly propagated in England are as follow:

1. The Little Musk Pear, commonly called the Supreme. This fruit, when ripe, is of a yellow colour; the juice is somewhat musky; and, if gathered before it be too ripe, it is a good pear. It ripens about the latter end of July, and continues good only a few days.

2. The Chio Pear, or Little Bastard Musk Pear. This is pretty much like the other, but smaller. The skin, when ripe, has a few streaks of red next the sun.

3. The Green Chissel, or Hastings Pear, is a middle-sized fruit; it always remains green, and is full of juice when ripe. It ripens in the beginning of August.

4. The Red Muscadelle is a large early pear, of great beauty; the skin is of a beautiful yellow striped with red, and the flesh has a rich flavour. This sometimes produces two crops in a year; the first about the end of July, and the second in September.

5. The Little Muscat is a small pear, the skin very thin, and of a yellowish colour when ripe. This fruit has a rich

musky flavour, but will not keep long. It is ripe about the beginning of August.

6. The Lady's Thigh, commonly called in England Jargonelle, is of a russet green colour from the sun, but towards it inclining to an iron colour; the flesh is breaking, and has a rich musky flavour. It is ripe about tthe middle of August.

7. The Windsor Pear has a smooth skin, and, when ripe, is of a yellowish green colour; the flesh is very soft, and, if permitted to hang but two or three days after it is ripe, grows mealy and is good for nothing. It becomes ripe about the latter end of August.

8. Jargonelle, commonly called Cuisse Madame. This is certainly the true French Jargonelle; and the pear which commonly goes by that name in England is the real Cuisse Madame or Lady's Thigh; and it is very probable that the names have been changed in coming to this country. This pear is somewhat like the Windsor; the skin is smooth, and of a pale green colour. This is a plentiful bearer; but the flesh is apt to be mealy if it stands to be ripe, which is about the middle of August.

9. The Orange Musk is of a yellow colour spotted with black; the flesh is musky, but very apt to be dry. It ripens about the latter end of August.

10. The Great Blanquet, or Bagpipe of Anjou. This pear has a smooth skin of a pale green colour; the flesh is soft, and full of juice of a rich flavour. It ripens about the middle of August.

11. The Little Blanquet Pear is much less than the former; of a pale colour, and the flesh tender and full of a rich musky juice. It ripens about the latter end of August.

12. The Long-stalked Blanquet Pear has a very smooth skin, white, and a little coloured towards the sun, and is full of a rich sugary juice. It is ripe at the latter end of August.

13. The Skinless Pear, or Early Russelet, is of a reddish colour, the skin extremely thin, and the flesh melting and full of a rich sugary juice. It ripens in the latter end of August.

14. The Musk Robine Pear, or Queen's Pear (also called the Amber Pear), is small, and of a yellow colour when ripe; it has a rich musky flavour, and is a great bearer. This pear ripens about the latter end of August.

15. The Musk Drone Pear has a skin of a yellow colour when ripe, and a rich musky taste; but is apt to grow mealy if left too long on the tree. It ripens about the beginning of September.

16. The Orange Pear is of a greenish colour; but the side next the sun changes to a purple colour when ripe; the flesh is melting, and the juice sugary, with a little perfume. It ripens in the beginning of August.

17. The Cassolette, or Green Muscat, is a small greenish pear with some specks in the skin. It is full of a rich perfumed juice, and ripens in the latter end of September.

18. The Great Onion Pear, Brown Admired, or King of Summer, is of a brownish colour next the sun, and is ripe in the beginning of September.

19. The Musk Orange Pear. The skin is green, and the flesh melting. It ripens in the beginning of September.

20. Avorat, or August Muscat. This pear has a smooth skin of a whitish yellow colour; the juice is richly sugared and perfumed, and it is esteemed one of the best summer pears yet known. It is a great bearer, and ripens in the beginning of September.

21. The Rose Pear, or Thorny Rose. This is shaped like the Great Onion Pear, but much larger, of a yellowish-green colour, but a little inclining to red next the sun. The flesh is breaking, and the juice musky. This ripens in the beginning of September.

22. Poire du Puchet. The flesh of this pear is soft and tender, and the juice sugary. It ripens in the beginning of September.

23. The Perfumed Pear is of a deep red colour spotted with brown; the flesh is melting, but dry, and has a perfumed flavour. It ripens in the beginning of September.

24. The Salviati Pear. This pear is red and yellow next the sun, but whitish on the other side; the flesh is tender, and the juice sugary and perfumed. It ripens about the middle of September.

25. The Rose-water Pear. The skin of this pear is rough, and of a brown colour, the juice is very sweet, and tastes like rose-water. It ripens in the latter end of September.

26. The Russelet Pear. The flesh of this pear is soft and tender, and the juice is agreeably perfumed. It ripens in the latter end of September.

27. The Great Mouth-water Pear. The flesh of this pear is melting and full of juice. It ripens about the latter end of September.

28. The Prince's Pear has a highly-flavoured juice. It is a great bearer, and ripens about the latter end of September.

29. The Summer Bergamot. This is sometimes called Hamden's Bergamot. The flesh is melting, and the juice highly perfumed. It ripens about the latter end of September.

30. The Autumn Bergamot is smaller than the former; the flesh is melting, and the juice highly perfumed, It is a great bearer, and ripens in the beginning of October.

31. The Summer Bonchrêtien is very full of juice, which is of a rich perfumed flavour. It ripens about the middle of September.

32. Beurré Rouge (the Red Butter Pear). The flesh is very melting and full of a rich sugary juice. It ripens in the beginning of October, and, when first gathered from the tree, is one of the very best sort of pears that we have.

33. The Dean's Pear. The flesh of this pear is melting and full of juice, which is very cold. This is a great bearer, and ripens in the beginning of October.

34. The Swiss Bergamot has a melting flesh and is full of juice. It ripens in the beginning of October.

35. The Long Green Pear. The flesh is melting and full of juice. It ripens in the latter end of October. This, by some, is reckoned the same with the Mouth-water.

36. The White and Grey Monsieur John. These are the same; the difference of their colour proceeding from the different soils and situations wherein they grow, or the stocks on which they are grafted. If this pear be rightly managed, there are not many sorts in the same season to be compared with it. The flesh is breaking, and full of a rich sugared juice. It ripens in the latter end of October or beginning of November.

37. The Flowered Muscat is an excellent pear; the flesh is very tender, and of a delicate flavour. It ripens in November.

38. The Vine Pear is of a dark red colour; the flesh is very melting, and full of a clammy juice. It comes into eating in November.

39. The Rousseline Pear is of a deep red colour, with spots of grey; the flesh is very tender and delicate, and the juice very sweet, with an agreeable perfume. It ripens about the latter end of October, but will not keep.

40. The Knave's Pear. The flesh of this pear is fine and tender, and the juice very much sugared. It ripens in the latter end of October.

41. The Marquiss Pear. If this pear do not change yellow in ripening, it is seldom good; but if it does, the flesh will be tender and delicate, very full of juice, which is sugared. It comes into eating in November.

42. The Crasane Pear. The flesh of this pear is extremely tender and buttery, and full of a rich sugared juice. It is the very best pear of the season, and comes into eating about the latter end of December.

43. The Lansac, or Dauphine Pear. The flesh of this pear is yellow, tender, and melting; the juice is sugared and a little perfumed. It is in eating the beginning of December.

44. The Martin See (the Dry Martin), is almost like the Russelet in shape and colour; the flesh is breaking and fine; and the juice is sugared, with a little perfume. It is in eating about the beginning of December.

45. The Amadot is rather dry, but high flavoured. It is in eating about the middle of December.

46. The Little Lard Pear is extremely fine; the flesh melting; the juice is much sugared, and has an agreeable musky flavour. It is in eating the latter end of December, and is esteemed one of the best fruits in that season.

47. Louisbonne (the Good Lewis Pear). The flesh of this pear is extremely tender, and full of a very sweet juice. It is in eating about the middle of December.

48. The Colmar Pear is very tender, and the juice greatly sugared. It is in eating about the beginning of January, and is esteemed an excellent fruit.

49. L'Eschasserie. The flesh of this pear is melting and buttery; the juice is sugary, with a little perfume. It is in eating about the first of January.

50. The Virgouleuse Pear is esteemed by some as one of the best fruits of the season*; the flesh is melting, and full of a rich juice. It is in eating about the first of January.

51. The Ambrette is esteemed a very good pear; the flesh is quite melting, and full of sweet perfumed juice. It comes into eating about the beginning of January.

52. Epine d'Hyver (the Winter Thorn Pear) has a very tender buttery pulp, of an agreeable taste, with a sweet juice highly perfumed. It is in eating about the latter end of December.

53. The St. Germain Pear† is a fine fruit, keeps long; the flesh is melting, and very full of juice, which in a dry season,

* In dry and cold seasons this pear is very apt to crack, which greatly diminishes its value.

† This pear, owing to the hot and dry summer, has come into eating six weeks sooner this season than I ever remember; and, of course, will be so much sooner out than usual.

It is to be observed, that in dry seasons, fruit should not be suffered to sweat so long in the heaps, (as directed in the chapter 'On Gathering and laying up Fruit;) perhaps a fortnight will be long enough.

or if planted on a warm dry soil, is very sweet. This is in eating from December till February.

54. St. Austin. This pear is pretty full of juice, which is often a little sharp; the flesh is tender, but not buttery. It is in eating in the latter end of December, and will continue good two months.

55. The Spanish Bonchrêtien is a large fine pear; the flesh is breaking, and the juice sweet. It is in eating in January.

56. The Wilding of Cassoy, called also the Small Winter Butter Pear, is a small fruit; the flesh is melting, and the juice very rich. It is in eating in January. This is an extraordinary good bearer. There was a tree of this kind at Cambden-house near Kensington, which generally produced a great quantity of fruit.

57. The Martin Sire, or the Lord Martin Pear, is a good fruit; the flesh is breaking and full of juice, which is very sweet and a little perfumed. It is in eating in January.

58. The Winter Russelet. The flesh of this pear is buttery and melting, and generally full of a sweet juice. It is in eating in the latter end of January.

59. Franc-real, or the Golden End of Winter, is only esteemed for baking.

60. TheBrown Beurré. This pear is of a reddish brown colour on the side next the sun, and yellowish on the other side. The flesh is melting, and full of a rich juice. It ripens in October, and is justly esteemed an excellent pear.

61. The Holland Bergamot, Amoselle, or Lord Cheney's, is a very good pear, the flesh is half buttery and tender, and the juice is highly flavoured, it will keep from the end of January till April.

62. The German Muscat is an excellent pear; it is buttery and tender, and the juice is highly flavoured. It is in eating from February till April or May.

63. The Pear of Naples, or Easter St. Germain, is half breaking; the juice is sweet, and a little vinous. It is in eating in March.

64. The Winter Bonchrêtien Pear is very large; the flesh is tender and breaking, and is very full of a rich sugared juice. This is in eating from the end of March till June.

65. La Pastorelle is tender and buttery, and the juice sweet. This is in eating in March.

66. St. Martial, or the Angelic Pear. The flesh of this is tender and buttery, and the juice is very sweet. This is in eating in March.

67. The Wilding of Chaumontelle is melting, the juice is very rich, and a little perfumed. It is in eating in January.

68. The Brown St. Germain is a very fine high flavoured pear on dwarfs and standards, and comes in after the Wall St. Germain. It continues in eating from December to the end of March.

69. Pear D'Auch was introduced by the late Duke of Northumberland. It much resembles the Colmar, but is fuller towards the stalk. It is in eating from Christmas to April, and is, without exception, the best of all the winter pears.

70. The Swan's Egg is a middle-sized pear, in shape like an egg; is of a deeper green colour, thinly covered with brown; the flesh is melting and full of a pleasant musky juice. It comes in eating in November. The tree is healthy, and bears well either as a standard or any other way.

71. The Bergamot de Pasque goes also by the following names, viz. the Terling, the Amoselle, the Paddington, and the Tarquin. This is a handsome fruit, green when gathered, and of a yellowish or straw colour when ripe. It comes into eating about the month of April, continues till June, and makes a very handsome appearance at table.*

72. The Golden Beurré is a very fine pear; It is of a beautiful scarlet colour next the sun, and of a gold colour on the other side. The flesh is melting and the juice high flavoured. It ripens in October. This tree succeeds best on an East aspect, and a loamy soil. It is a plentiful bearer.†

A Selection of Pears, from the Catalogue of Messrs. Anderson, Leslie, and Co. Nurserymen, Edinburgh.

SUMMER PEARS.

Pear James; soon ripe, soon rotten; has a little flavour, and is the earliest pear that we have in Scotland.

Early Carnock; indifferent, of a yellow colour, and bright red towards the sun; makes a beautiful standard.

Lemon, Lady's Lemon, or Lady Lamont; indifferently good; principally valued for coming early, and being a good

* This pear has come into eating above six weeks sooner this season than in any other in my memory.

† This pear was introduced from Burgundy by the late Marshall Conway, and was first raised in this country, at his seat of Park Place near Henley upon Thames, now the seat of Lord Malmesbury. The above description was transmitted to me by Mr. Copland, his Lordships gardener.

bearer. Green Pear of Pinkey; a small green pear, nearly round, of a sweetish taste.

Forrow Cow, a Clydesdale Pear; a large pear with a short stalk; flat towards the eye; its colour red and yellow; its flesh tender and musked.

Pear Sauch, a Clydesdale Pear, a big-bellied beautiful pear; the tree large, a great bearer, and fit for an orchard; the pear but indifferent.

Gray Honey, pretty good.

Green Orange Pear, or Orange Vert; a very good pear.

Brute Bone, Chaw Good, or the Pope's pear; indifferent.

Golden Knap, supposed Scotch, is a small summer Pear of tolerably good qualities.

Early Achan, an indifferent fruit, greatly inferior to the Winter Pear of that name.

Hanging Leaf; this is its name in Clydesdale; good and beautiful, almost round, its colour red and yellow; a delicious sweetness is found in its taste.

Scots Bergamot, a large good pear, of a yellow and red colour; its flesh tender and juicy.

Longueville, very good, but a precarious bearer; supposed French, but not in their catalogues by that name.

Musked Boncrêtien, Gratioli, Cucumber, or Spinola's Pear; a very good pear, if grafted on a free stock; its pulp is somewhat between short and tender, with a great deal of perfumed juice; its colour red on one side, and white on the other.

Saffron Pear; a pretty large well shaped pear, fit for an orchard.

AUTUMN PEARS.

Keather, a Clydesdale Pear, of middling size, and oblong shape, its juice agreeable.

French Carnock: tolerably good.

Elshin Haft, or Good-man Pear; a long pear, flat towards the eye; its colour green and yellow; its flesh hard, dry, and sweet.

Drummond, or Late Scotch Carnock; very good, if eaten before it grows mealy; its colour a bright red and yellow.

Vicar, an oblong pear, its colour yellow, red and striped, tender, sweet, and musked, but dry.

Royal Orange Bergamot; this differs from the Orange Bergamot in being yellower, and sometimes having a faint red on one side.

Green Pear of Yair; sweet, juicy, and melting; of a moderate size; takes its name from Yair, on Tweed-side, where it was first discovered.

Rob Hind; very indifferent.

Le Besideri, the Wilding of the Forest of Ileri in Bretagne; a yellowish pear of a middle size; indifferent.

Unicorn Pear; of a beautiful red and yellow colour, but rather austere in taste.

WINTER PEARS.

Winter Achan, a Scotch Pear; among the best early winter pears, and equal to most of those of French origin.

Brier Brush, Scotch; a good pear, and will ripen in most seasons; it is a small pear, of a firm substance and sweet taste.

Brompton Park; a seedling sent by Jeffery by that name.

Round Winter, a Clydesdale Pear; a very excellent winter pear, as described in Dr. Gibson's Fruit Gardener.

Poir Portrail, or Gate Pear; for baking.

La Double Fleur, or the Double Flowering Pear; a large flat beautiful pear, with a smooth skin, and blush colour on one side, and yellow on the other; the best pear to preserve, taking a beautiful red colour from the fire.

*In the following additional List, those marked * are best for baking or stewing, and those † for making of Perry.*

Ambrosia Pear,
Ashton Town,
Autumn Musk Bonchrêtien,
Bishop's Thumb,
* Bloody Pear,
Brocas Bergamot,
† Barland,
* Besideri,
Beaurré de Roi,
* Black Pear of Worcester,
Britannia,
Burdelieu,
* Catillac,
Doyenne, or St. Michael,
Easter St. Germain,
Gansel's Bergamot,
Golden Beurré,
Gray Beurré,
Gray Goodwife,
Green Sugar,
Green Bergamot,
Huntingdon Pear,
† Huffcap,
King's Catharine,
Lammas,
London Sugar,
Muscat Almain,
Musk Blanquet,
† Oldfield,
Orange Bergamot,
Pear Piper,
Pirus Pollveria,
Red Admirable,
Scotch Bergamot,
Seven Angled,
Silver Striped,
* Spanish Red Warden,
† Squash,
Striped Verte Longe,
White Beurré.

To those who have small Gardens, and room only for a few Trees, I would recommend the following as the most useful, viz.

Summer Pears....The Musk Pear, the Green Chissel, Jargonelle, Summer Bergamot, Summer Bonchrêtien.

Autumn Pears....The Orange Bergamot, Autumn Bergamot, Gansel's Bergamot, Brown Buerré, Doyenne or St. Michael, and Swan's Egg.

Winter Pears.....Crasane, Chaumontelle, St. Germain, Colmar, D'Auch, L'Eschasserie, Winter Bonchrêtien, and Bergamot de Pasque.

The above will furnish a regular succession of fruit.

Of the Management of Pear-Trees.

It will be unnecessary to say much here on the choice of young pear-trees, as the rules already laid down are sufficient for that purpose.

I would advise those who intend to plant pear-trees, instead of choosing young ones, to look out for the oldest that they can find in the nursery, and with strong stems; to have them carefully taken up, with as much of the roots as possible, and carefully planted, after cutting in the roots a little, spreading them as horizontally as you can. Then fill up all round the roots with light dry mould; forcing it in about those which lie hollow, with a sharp pointed stick; filling the hole up to the top without treading the mould, till you have first filled the hole with as much water as it will contain, leaving it a day or two until the ground has absorbed the water; then throw on some fresh dry mould, and tread it as hard as you can; fill the hole up again with mould to within an inch of the top, and give it a second watering, leaving the mould about three inches higher than the border, to settle of itself, and to receive the rain that falls, for at least a month. When the mould has become quite dry, you may tread it a second time; then make a large bason all round the tree, and give it another watering; then mulch the top over with some rotten leaves or dung, observing to water the trees once a week in dry weather, and sprinkle the tops frequently with a pot, or hand-engine, to keep the wood from shriveling till the trees have taken fresh root.

The method of pruning pear trees is very different from that practised for apple-trees in general. The constant practice has been, to leave great spurs, as big as a man's arm, from one foot to 18 inches long. [*See Plate 7. Letter* C.] The constant

pruning inevitably brings on the canker; and, by the spurs standing out so far, the blossom and fruit are liable to be much injured by frost and blighting winds, and thus the sap will not have a free circulation all over the tree. The sap will always find its way first to the extremities of the shoots; and the spurs will only receive it in a small proportion, as it returns from the ends of the branches. The fruit standing at so great a distance from the branch, is liable to be hard, spotted, and kernelly; as *Letter* D. *Plate* 7.

I have adopted the following method when the trees were all over cankered, and the fruit small, and not fit to be sent to the table. I cut the tops off as near as possible to where they were grafted; always observing to cut as close to a joint or bud as possible. The buds are hardly perceptible; but you can always know where the joints, or forks, are, by the branches breaking out of the sides.

Finding the pear-trees in Kensington Gardens in a very cankery and unfruitful state, in the years 1784 and 5, I took out the old mould from the borders against the walls, and put in fresh loam in its stead; at the same time I pruned and nailed the trees in the common way, and left them in that state upwards of eighteen months, to see what effect the fresh mould would have on them; but to my great surprize, I found that it had no good effect.

After I had tried the fresh mould as above, I began to consider what was best to be done with so many old pear-trees that were worn out. The fruit that they produced I could not send to his Majesty's table with any credit to myself, it being small, hard, and kernelly. I thought it would be a great reflection on me as a professional man, that after I had put his Majesty to so great an expence, no advantage was likely to be derived from it. I saw that some new method must be tried to restore these old trees, or that next year they must be grubbed up, and was loth to give them entirely up before I had tried some experiments. I considered, that it must be between twelve and fourteen years before I could have any fruit from young trees; and therefore determined to try an experiment, with a view of recovering the old ones.

I began with cutting down four old decayed pear-trees of different kinds, near to the place where they had been grafted: This operation was performed on the 15th of May, 1786. Finding that they put forth fine shoots, I headed down four more on the 20th of June in the same year (for by this time the former had shoots of a foot long), which did equally well, and bore some fruit in the following year. One of the first

four that I headed down was a St. Germain, which produced nineteen fine large well-flavoured pears next year, [*See Letter* B. *Plate* 7.] and in the third bore more fruit than it did in its former state when it was four times the size.

I left seven trees upon an East aspect, treated according to the common method of pruning, which bore the following number of pears upon each tree:

Epine d'Hyver produced eighty-six pears, and the tree spread fifteen yards.

A Crasane produced one hundred pears, and the tree spread fourteen yards.

Another Crasane produced sixteen pears, and the tree spread ten yards.

A Virgouleuse produced one hundred and fifty pears, and the tree spread nine yards.

A Colmar produced one hundred and fifty pears, and the tree spread nine yards.

Another Colmar produced seventy-nine pears, and the tree spread ten yards.

A L'Eschasserie produced sixty pears.

Seven trees, headed down and pruned according to my method, leaving the fore-right shoots in summer, bore as follows, in the fourth year after heading.

A Louisbonne bore four hundred and sixty-three pears, and the tree spread nine yards.

Another Louisbonne bore three hundred and ninety-one pears, and spread eight yards.

A Colmar bore two hundred and thirteen pears, and spread six yards.

A Brown Beurré bore five hundred and three pears.

Another Brown Beurré bore five hundred and fifty pears.

A Crasane bore five hundred and twenty pears.

A Virgouleuse bore five hundred and eighty pears.

The branches of the four last trees spread nearly in the same proportion as the first three.

A young Beurré, the second year after heading, bore two hundred and thirty pears; and a St. Germain, four hundred.

All the above trees stood upon the same aspect and the same wall, and the fruit was numbered in the same year. A great many pears which dropped from the trees are not reckoned. The trees that were pruned according to the old practice covered at least one-third more wall than the others.

By the above statement it appears, that the trees headed down bore upwards of five times the quantity of fruit that the others did; and it keeps increasing in proportion to the progress of the trees.

On the 20th of June, (same month will do for America), I headed several standards that were almost destroyed by the canker; some of them were so loaded with fruit the following year, that I was obliged to prop the branches, to prevent their being broken down by the weight of it. In the fourth year after these standards were headed down, one of them bore two thousand eight hundred and forty pears. There were three standards on the same border with the above, two of which were St. Germains; the old tree was of the same kind. One of these trees*, twenty years old, had five hundred pears on it, which was a great crop for its size: So that there were on the old tree, which had been headed down not quite four years, two thousand three hundred and forty pears more than on the tree of twenty years growth.

When the men numbered the pears, there was near a barrow full of wind-falls at the bottom of the old tree, which were not included.

Plate 8 is a correct drawing of an old decayed Beurré pear-tree, (restored from an inch and a half of bark) which now covers a wall sixteen feet high†. In the year 1796, it bore four hundred and fifty fine large pears, and has continued in a flourishing state ever since. The letters *a*, *a*, *a*, represent the fruit buds for the present year; *b*, *b*, *b*, are those forming for next year; and *c*, *c*, *c*, the old foot-stalks that bore the fruit last year: The small buds are beginning to form, which produce fruit the second year; and *d*, *d*, are the fore-right shoots as they appear before they are cut, which must be at *e*, close to a bud, leaving them as regular as possible all over the tree; you will then have a regular crop of fruit from the stem to the extremities of the branches: but if this be not observed, you will have hardly any fruit next year.

The following is the method which I pursue in training trees that are cut near to the place where they were grafted.

Every year, in the month of March (middle of April for America), I shorten the leading shoot to a foot or eighteen inches, according to its strength; this shoot will, if the tree be strong, grow from five to seven feet long in one season;

* This tree was about six years old when I planted it, fourteen years ago.

† I saw this tree, as, indeed, I did all the others that are represented in the plates, at the end of the work; and a most gratifying sight it was to me. The remains of the old bark were easily distinguishable from the new bark, which looked precisely like that of a young tree.....The same operation would produce the same effects in standards as well as wall trees, and in America as well as in England.

and, if left to nature, would run up without throwing out side shoots. The reason for thus shortening the leading shoot is, to make it throw out side shoots; and if it be done close to a bud, it will frequently cover the cut in one season, leaving only a cicatrix, as at *f*, *f*, *f*, in plate 8, which shew every year's growth and cicatrix. When the shoots are very strong, I cut the leading shoot twice in one season; by this method I get two sets of side shoots in one year, which enable me the sooner to fill the tree. The first cutting is performed any time during the spring, and the second about the middle of June.

When you prune the trees, and cut the fore-right shoots, which should be done in February or March (not sooner than the middle of March in America), always cut close to an eye or bud, observing where you see the greatest number of leaves at the lower bud, and cut at them; for at the foot-stalk of every one of these will be produced a flower bud. You will have in some sorts of pears, in a favourable season, from five to nine pears in a cluster. This cutting should not be later than March or the beginning of April, (it may be done till the middle of April in America) on account of the leading shoot beginning to grow; the next topping, when the leading shoot grows quick enough to admit of it, should be about the middle of June (latter end of June in America), and the length of the shoots should be according to their strength, having from three eyes, or buds, to six on a side. Plate 8, will better explain the different years' growth, &c. than I can do by words. The lowest *f*, is the place where we began to cut the top off; and *g*, the old decayed stump, with very little bark left.

The cankery part beginning to effect the new bark, I cut off all the canker at the bottom last year, and plastered the place with some cow-dung mixed with wood-ashes and powder of burnt bones, put into as much urine and soap-suds as would make it of the consistence of thick paint; this I laid on with a painter's brush. After it had been applied about three hours, I patted it gently down, with my hand, close to the tree. By so doing, I get rid of all the air bubbles that may be under the composition, and make it adhere to the tree, preventing it from being washed off by heavy rains.

In the beginning of August (same season in America), we shorten the fore-right shoots to about four inches long; by this time the shoot will have made its full growth for the season, and will produce fine strong eyes for the following year.

The tree above-mentioned had a decayed rotten root, the dead part of which I cut all away, till I came to the sound wood. Whenever the trunk is hollow, you must follow it under ground till you have cut out all the decayed parts and rotten roots; otherwise you will lose the tree.

By proceeding according to the foregoing directions, the root will be renewed, while the tree is forming a fine handsome head. In the mean-time trench your borders, taking up all the old roots, and add some fresh mould to them, if you can conveniently get it; if you cannot, remove all the sour mould that is about the roots of the trees, and put in some taken from the border, at a distance from the wall; always remembering to lay the top spit next to the roots of the trees; also, mix some vegetable mould, from the melon and cucumber beds, with rotten leaves, as a manure for the borders.

I have headed down many trees that had not this preparation; and yet they throve very well, but did not send forth such fine roots and shoots as those that were so prepared.

If the above directions be followed, you will get more pears in three or four years than you can in twenty-five years by planting young trees, and pruning and managing them in the common way.

If pears are grafted on free stocks, such as Colmars, Pear D'Auch, Crasanes, L'Eschasseries, Virgouleuses, and Winter and Summer Bonchrêtiens.

The depth of the mould for pear-trees should never be less than three feet, laying the best mould at top, to encourage the roots to come as near the surface as possible. If the bottom be clay it will be very necessary, once in every five or six years, to open the ground round the roots of the trees, and cut off all the large ones that are inclining to run into the clay; by so doing your trees will throw out fresh roots that will run near the surface, provided the mould is good near the top.

You may have a crop of early peas, lettuce, or spinach, or any other small crops on the ground, during the winter and spring; but no late crops by any means. If the ground can be spared, I would advise to have no summer crops; but keep the borders hoed, in particular after rain, otherwise the ground, if a strong loamey or clayey soil, will be apt to crack in dry weather; but by frequent stirring between wet and dry this will be in a great measure prevented, and the sun's rays admitted into the mould, which will greatly heighten the flavour of the fruit. When you can conveniently spare the ground in winter,

it should be ridged up to sweeten the mould; which you may very well do, if you sow early peas on the sides of the ridges; which is by far the best way to preserve the peas from the frost, and to prevent them from rotting, which will sometimes happen, if the land be strong, before they begin to vegetate. Or, you may sow an early crop of carrots or spinach in the ground.

CHAPTER VIII.

OF VINES.

Different Sorts of Vines cultivated in England...Of their Propagation....Experiments on Training and Pruning, with full Directions for the right Performance of both...Use of the Composition in Pruning...Of Watering...Preserving Grapes from Flies, Wasps, and Birds...Of gathering Grapes, and keeping them in Winter.

THE Vine is a native of most of the temperate parts of the world, and has been cultivated ever since the flood. It belongs to the first order of Linnæus's fifth class, Pentandria Monogynia.

I shall here select those vines which are most esteemed in this country, for the hot-house, vinery, and natural wall; and give a short descrption of each.

N. B. The letter *h* distinguishes the proper sorts for a hot-house; the letter *v* for a vinery; and the letter *w* for a common wall.

1. The July Grape, or Morillon Noir Hatif, is a small round black berry, of a sugary juice, and is principally esteemed for being early ripe, which is in September. *v. w.*

2. The Royal Muscadine, D'Arboyce, or Chasselas Blanc, is an excellent grape; the bunches are large and composed of round amber-coloured berries of a rich vinous taste. In a fine season it ripens in September. *h. v.*

3. The Malmsey Muscadine somewhat resembles the preceding; the juice is very sweet, and of a high flavour. This is a good bearer and a very fine grape. *w. v.*

4. The Black Muscadine. This is a good bearer, and the berries are beautifully powdered with a bluish bloom. *h. v.*

5. The White, or Common Muscadine, by some called the Chasselas. This resembles the Royal Muscadine, but the berries are smaller; and, although it is not so sweet as the

Royal, it is the best grape that we have for a common wall, and a great bearer. *w.*

6. The White Muscat of Alexandria, or Alexandrian Frontinac. The berries are oval, and the bunches long. This grape has a rich vinous juice, and is esteemed an exceeding good grape for the hot-house. *h.*

7. The Red Muscat of Alexandria resembles the former; only the berries are red. *h.*

8. The White Muscat, from Lunel. This grape has large oval berries of an amber colour, and full of a vinous juice. This vine is a plentiful bearer, and highly esteemed. *h. v.*

9. The Black Muscadel has large oval berries of a black colour, and pleasant juice. *h.*

10. The Red Muscadel has large red berries of an oval shape, and ripens late. The bunches are very large. *h.*

11. The Black Damascus has large, round, black coloured berries; the flesh is rich, and well flavoured. This is an excellent late grape. *h.*

12. The Black Grape from Tripoli has large black berries, and is an excellent grape. *h.*

13. The Black Spanish, or Alicant Grape. This grape has black berries of a pleasant flavour. *h. v.*

14. The Black Grape from Lisbon. This grape has large round juicy berries, and the bunches resemble the Black Hamburgh. This is a good grape. *h. v.*

15. The Black Frontinac, or Muscat Noir. This grape has pretty large round berries, black when ripe, and covered with a mealy powder. It has a rich vinous juice, and ripens in October. *v. h.*

16. The Red Frontinac, or Muscat Rouge, is a very fine grape, and greatly esteemed. It has large brick-coloured berries, and the juice is of a highly vinous flavour. *v.*

17. The White Frontinac, or Muscat Blanc, has large bunches composed of round berries. The juice of this grape, when fully ripe, is exquisite. *h. v. w.*

18. Grizzly Frontinac has round berries, of a colour composed of brown, red and yellow. This grape has an excellent flavour. *h. v.*

19. The White Sweet Water. The berry is large, of a white colour and very agreeable juice. This is esteemed an excellent grape, and ripens in September. *h. v. w.*

20. The Black Sweet Water has a small roundish berry of a sweet taste; but, being apt to crack, is not much in repute. The birds are very fond of this grape, which ripens in September. *v. w.*

21. The Black Hamburgh. The bunches of this grape are large, composed of large oval black berries, of a pleasant sweet juice and vinous flavour. It ripens in November. *h. v.*

22. The Red Hamburgh has thin-skinned berries of a dark red. They have a rich vinous flavour, and ripens about the same time with the former. *h. v.*

23. The White Hamburgh. This grape has large oval-shaped berries, and is a pretty good bearer. *h.*

24. The Small Black Cluster has small oval berries. The leaves are covered with a hoary down. This is a very pleasant fruit. *v. w.*

25. The Large Black Cluster is larger than the former, and has a very rough harsh taste. Mr. Speechly says, that he had this grape from Lisbon, and was assured that it is the grape of which they make Red Port Wine. I have had the same grape eight or ten years. *v.*

26. The White Grape from Alcobaca. This grape bears large bunches of white juicy berries. *v.*

27. The White Morillon has an oval-shaped juicy berry. The leaves are downy on the under side. *h. v.*

28. Early White Grape from Teneriffe. The berries are of a middling size, and the flesh remarkably sweet and juicy. *v. w.*

29. The White Parsley-leaved Grape, or Ciotat. This grape has round berries, white, juicy, and sweet. There is a sort of the parsley-leaved grape with red fruit. *v.*

30. The White Corinth Grape has a small round berry, with a fine juicy flesh of an agreeable flavour. *v.*

31. The Aleppo Grape has middle-sized berries, with a juicy flesh of a very fine flavour. This is a curious grape, frequently striped black and white. *h. v.*

32. The Red Grape from Syracuse. This is a very fine large grape. *h.*

33. L Cœur Grape, or Morocco Grape. This grape has berries of a tawney colour, and is highly esteemed. *h.*

34. The Golden Galician Grape has large oval berries, of a yellow colour, and tolerable flavour. *h.*

35. The Black Raisin Grape. This species has large black berries of an oval form. The skin is thick, and the flesh firm. *h.*

36. The White Raisin Grape resembles the preceding, only that the berries are white. *h.*

37. The Malvoise, sometimes called the Blue Tokay, has small brownish berries, powdered with a blue bloom. The juice is vinous. *h. v.*

38. The Genuine Tokay is a white grape, with a thin skin, delicate flesh, and agreeable juice. *h. v.*

39. The Lombardy Grape has fine large flame-coloured berries full of a fine juice; and the bunches grow to a great size, frequently weighing more than six pounds. *h. v.*

40. The Smyrna Grape. This has a large red berry of a very fine flavour, and is esteemed a very good grape. *h. v.*

41. The Brick Grape, so called from its colour, has small berries, but the juice is sweet. *v. w.*

42. The Claret Grape has small black berries, with a blood-red juice; but the grape is very harsh, if not perfectly ripe. *h. v.*

43. The Syrian Grape. This has large, white, oval berries, with a thick skin and hard flesh. It is a good bearer. *h.*

44. The Auverna, or True Burgundy Grape, sometimes called the Black Morillon, is an indifferent fruit for the table; but is esteemed one of the best for making wine. *v. w.*

45. Cat's Grape. This Grape has small berries of a pale green colour. The flesh is soft and juicy, but of a very disagreeable taste, unless quite ripe. *h. v.*

46. The Damson Grape has very large berries of a purple colour. *h.*

47. St. Peter's Grape has a large oval berry, of a deep black colour when ripe; the bunches are large, and the flesh juicy; it ripens late. *v.*

48. The Greek Grape. The berries are of a bluish white colour; and it is esteemed a fine grape. *h. v.*

49. The Black Corinth, or Currant Grape, is a small roundish berry, generally without a stone, of a deep black colour. It has a sweet juice, and ripens in October. *h. v.*

50. The Cornichon Grape has berries of a remarkable shape, long and narrow, of a white colour, with a firm sweet flesh. *h.*

51. The Red Chasselas is very like the Chasselas Blanc in size and shape, but is of a dark red colour. It is a very good grape, but ripens later than the white.

52. The New Muscat of Jerusalem was introduced by Mr. Philip Miller, a vine of which is now in the Botanic Gardens at Chelsea. It has large round berries of a red colour; some of which I have, in fine seasons, seen as large as a gooseberry; but, as it does not ripen well on the natural wall in this country, it might be worth while to try it in a hothouse, or vinery. It was introduced here about thirty-six years ago. *h. v.*

53. The Black Prince. This has fine large berries, and the bunches grow to a large size: I have had them, in a favourable season, on the natural wall, weigh a pound and a half. This grape very well deserves a place in the hot-house and vinery.

To the foregoing may be added:

Black Frankindale,
Black Gibraltar,
Black Muscat of Alexandria,
The Miller Grape,
New White Sweet Water,
Passe Musk,
Pearl Muscadine,
Red Constantia,
Red Raisin,
Sir Abraham Pitcher's Fine Black,
West's St. Peter,
White Constantia.

From the Red and White Constantia is made the famous Constantia Wine, so called from a place near the Cape of Good Hope.

My worthy friend, Colonel Paterson*, informs me, that this vine, when transplanted to but a small distance from that spot, produces a very inferior wine. In his narative he says, "Constantia produces excellent wine, though the situation is rather low. It is, however, preferable to all other parts of this district; not only because it is rather more elevated, but on account of the nature of the soil, which is a light sandy loam."

Select Vines for a small Garden.

The White Muscadine; White Sweet Water; Black Sweet Water; Large Black Cluster; Small Black Cluster; the Miller Grape.

St. Peter's, and the Black Hamburgh, will do very well in favourable seasons.

Of the Propagation of Vines.

The vine is propagated by seeds, cuttings, and layers; and by grafting and inoculation.

When vines are to be raised from seed, it should be sown about the latter end of February, or beginning of March, in pots filled with light fresh mould, and plunged in a moderately warm hot-bed, gently sprinkling the mould from a watering-pot having a fine rose. About six or eight seeds, if good, will

* This gentleman is well known in the Literary World, by his Narative of Four Journies into the Country of the Hottentots, and Caffraria; from whence he sent a great many new plants and seeds to England. He also brought home with him some curious skins; and good drawings of many plants, animals, &c.

be sufficient for a small flower-pot; for, if sown too thick, the plants are apt to be drawn, and thereby become very weak. In dry weather, the pots should be watered gently every day; but in wet or moist weather this may frequently be omitted, giving them so much only as will keep the mould moist till the plants begin to vegetate. The proper time for watering is in the afternoon, when the sun is going off the frame. Observe to shut the frame down immediately after watering; and if the heat be not too great, it may remain shut during the night. As the heat of the bed begins to decay, you must add a lining of horse-dung and fresh leaves; which, when occasion requires, may be shaken up and repaired by adding some fresh leaves and dung to it, and thus keep up a proper warmth till the plants have got sufficient srength to do without any bottom heat.

About the latter end of August it will be necessary to take the lights off, that the plants may be hardened before winter, taking care to shelter them in frames covered with mats, which will prevent the frost in the latter end of October and beginning of November from injuring the tender shoots.

When the plants are about six inches high, they should be transplanted singly into deep pots, filled with the same sort of vegetable mould as is directed to be used for vines; taking great care not to hurt the roots, nor to break the leaders; then plunge them again into the hot-bed; but if the heat of the old bed be too much decayed, it will be necessary to have a new one prepared before-hand to receive the pots as soon as the plants are transplanted. If they grow vigorously, it will be necessary to shift them into still larger pots.

When the plants are above six inches high, they should be carefully tied to small rods, leaving only one stem for the first year. The rods should be as high as the frames will permit.

When the leaves begin to drop, they should be carefully picked off the pots, to prevent the plants from getting mouldy, which would very much injure them.

The plants should be kept under frames, or put into the green-house, in hard winters, to shelter them from severe frosts. In the spring, about March or the beginning of April, (middle of May in America), if from seed ripened in this country, they may be planted out against the walls where they are to remain; but, if from seed imported from vine countries, I would advise not to plant above one or two against the wall, or in the hot-house, before you have obtained a spe-

cimen of the fruit, and be satisfied that they are worth cultivating.

After they are planted, they should be cut at the third eye*, if strong; but at the second, if weakly: At the same time remember to rub off the lower bud with your finger and thumb, as hereafter directed.

If vines are to be propagated from cuttings, they should be chosen from the shoots that are best ripened, and have the shortest joints; always having one or two joints of the last year's wood, cutting it perfectly smooth and a little rounding at the lower end, and as near to a joint of the old wood as possible. The upper end should also be cut smooth and sloping towards the wall; but if they are planted in beds or borders, let the cut always face towards the North. When cuttings are planted against piers or walls, let it be at about a foot distant from each other, according to the vacant space, and so deep as to have the second eye level with the ground; remembering always to rub off the lower eye. By so doing, if no accident happens to the top bud, there will be a shoot produced from each eye, with a little one under, which should always be rubbed off as soon as it begins to swell; for if suffered to grow to any considerable size you will be in danger of injuring the large one in rubbing the small one off. Remember also to pick off all the runners and side shoots, as before directed, leaving only two shoots, which should be trained at their full length. About January or February they may be pruned†, leaving one or two eyes on each according to the strength of the shoot, which should be managed as shall be more fully explained hereafter.

In the first year, especially if the summer be dry, and proper attention be not paid to the watering of them, they will make but little progress; but in the second year you will plainly discern which is the strongest plant, which only should be left to fill up the vacant space on the wall: The rest should be taken up and planted in other situations where they are wanted.

Mr. Speechly and others practise a method of propogating the vine from one eye and a few inches of the preceding

* That is, three eyes from the ground.

† In America the pruning of vines should be performed, not in the fall, for the hard frost is then apt to kill the joints which are cut, and, sometimes it kills the whole branch. Neither should it be done too late in the spring, for the vegetation is so rapid, and the sap mounts in such abundance, that the vines are in great danger of bleeding to death. The latter end of February, or the first week in March seems to be the best time; but, as the seasons differ so widely in different years, much must, on this point, be left to the observation and judgment of the cultivator.

year's wood, which he prefers to those raised by cuttings in the common way, for the following reasons: "They have more abundant roots, grow shorter jointed, are more prolific, and will, if permitted, come into bearing the second year."

You should make choice of the cuttings after a warm dry season, such as last year (1800); but not after such as the year before, when the wood did not ripen properly, owing to the wet and cold season. Each cutting should have two inches of the old wood, with one eye of the new. When you prune your vines you will have great choice; you should then select your cuttings of a middling size, the wood round and perfectly ripened.

If, however, my friend, Monsieur Le Geau, of Spring Mills, will have the goodness to add his opinion at the bottom of this note, the reader will, I am certain, derive great advantage from it.

Vines are also propagated by layers in the following manner: Take layers from walls or palings, observing to train the shoots at full length during the summer. Then, about the month of February, take some of the finest and strongest shoots, and lay them in the ground about six inches below the surface; at the same time making an incision or two in the old wood, or giving it a twist just below a joint: They will generally take without notching or twisting; yet, as it is the surer way, I would advise it to be done. The tops of the layers should then be cut off, leaving two or three strong eyes upon each.

When the shoots begin to run, they should be tied to long stakes, to prevent their being broken by the wind. All the runners and side shoots are to be picked off, leaving only two or three fine strong shoots on each plant, which should be trained at full length during the summer.

After the shoots are laid, it will be necessary mulch them with good rotten dung, or rotten leaves, which will keep the mould moist; and in very dry summers, such as the last (1800), it will be necessary to give them a good watering once or twice a week: this will wash in the dung or leaves about the roots, and cause the layers to shoot more vigorously.

In choosing vines from the nursery, I would recommend those which have the strongest and longest shoots.

If the foregoing directions are properly attended to, the plants will be rooted and fit well for planting out in the autumn.

When any are to be planted out, they should be carefully cut off from the mother vine and carried without shaking the earth from their roots, to the spot, where they are to be planted.

If the season be warm and fine, the grapes of early kinds ripen very well on these layers before they are taken up; and, if properly managed, they will bear some fruit the first year after planting. One of the strongest shoots must be left nearly at full length, cutting it as high as the uppermost full bud, leaving nothing but round well-ripened wood. If there are three shoots, the remaining two should be cut so as to leave only two full eyes upon each, which should be trained at full length, as before directed, to produce fine wood for next year. The shoot which was trained the preceding year should then be cut down, leaving only two strong eyes to produce wood for the following year; and so on every year, cutting the branches alternately; by so doing, you will be able to keep your walls always covered with fine healthy bearing wood.

This method of laying is practised with great success by many Nurserymen in the neighbourhood of London; in particular by Messrs. Gray and Wear at Brompton-park nursery, and by Messrs. Kirke at Brompton; each of whom raises annually several hundred plants, for which they find a great demand.

If any vines that have been raised from seed should not prove to be of a good flavour, they will be very fit to graft or inarch the finer sorts of vines on: As the coarser sorts grow more vigorous than the finer, they are, for that reason, fitter for grafting or inarching.

The best manure for vines is a mixture of vegetable mould* rotten spit dung, and fresh loam (turf and all); this should be thrown in a heap, and frequently turned, for a year or two before it is used.

Observations and Experiments on the Training and Pruning of Vines.

The following is the method that I pursued with some vines which were planted against the piers of a South wall, and among old peaches, nectarines, plums, &c.

When I took them in hand, the fruit was so small and hard as to render it unfit to be sent to the table. The vines were trained upright, which caused them to grow so luxuriantly that the sap flowed into the branches instead of the fruit.

* For producing vegetable mould see the directions for the management of apple-trees.

In the year 1789 I let two strong branches grow to their full length without topping them in the summer. In 1790 I trained them in a serpentine form [*See Plate* 10,] leaving about thirty eyes on each shoot, which produced one hundred and twenty-fine bunches of grapes, weighing from one pound to a pound and a quarter each. Every one that saw them said, that the large ones were as fine as forced grapes; while the small ones produced from branches of the same vine, trained and pruned in the old way, were bad natural grapes, and not above twice the size of large currants*.

More fully to prove the success attending this experiment, I next year trained five plants in the same way, allowing the shoots intended for bearing wood to run to their full length in summer, training them wherever there was a vacancy between the old trees; where there was none, I ran them along the top of the wall, without topping them. In winter I trained them in a serpentine manner so as to fill the wall as regularly as possible: They were as productive as those in the former year.

After a three years' trial, I thought I was warranted to follow the same practice with the whole; and in the year 1793 I sent, for the use of his Majesty and the Royal family, three hundred and seventy-eight baskets of grapes, each weighing about three pounds, without planting a single vine more than there were the preceding year, in which I was able to send only fifty-six baskets of the same weight; and those so bad and ill-ripened that I was ashamed of them, as they were not fit to be sent to the table.

In this year there was more than a quarter of the crop destroyed by birds and insects, and rotted by the wet.

Although the above statement is within the bounds of truth, it may appear to the reader like an exaggeration; but it is in the power of every one, who will follow the directions here given, to prove the advantage that will accrue from this method of training.

The above experiments were all made on the natural walls, and I hope will be sufficient to convince every unprejudiced person of the great advantage that the serpentine method of training vines possesses above the common way.

It may be proper to observe, that the shoots should be brought as near as possible from the bottom of the vine, that

* I conjure the American planter to read this with attention. With a due observance of the directions here laid down, how plentiful might good grapes become in Pennsylvania, New-Jersey, and New-York!

the wall may be well covered. When the walls are high, and the shoots from the serpentine branches strong, we sometimes let them remain; but if the walls are low, and the serpentine branches produce weak shoots, we cut them out in the autumnal pruning, and train up the strongest of the young wood in their room; as directed in the explanation of plate 10.

On the Pruning and Training of Vines.

It is to be observed, that the wood must be strong, or the vines will produce small bunches. If that be the case, cut them down to two or three eyes, in order to have strong wood for next year. Vines bear their fruit on the wood that was produced the preceding year. If their be a great deal of old naked wood on them, as generally is the case, with some small weak shoots at the extremities, always cut them down as near to the ground as possible; you will then have no fruit for that year*. Or you may cut every other shoot, leaving the old ones to produce some small grapes. The next year you will have plenty of fine wood, provided you take care to nail in the strongest shoots, and pick off all the side shoots that are produced from the eyes, pinching them off with the finger and thumb, or cutting them out with a sharp penk-nife close to the bud or eye; but never twist them; for by twisting them you will hurt the bud that produces the grapes next year; always observing to cut as near to the bud as possible, and taking care to lay in the wood very thin in summer, that the sun and air may be freely admitted to ripen it: By these means it will grow very strong. Take care also to keep the shoots nailed to the wall, which will prevent their being broken by the high winds; observing to pick off all the side shoots every time you nail them, which ought to be done several times during the summer months, according to the quickness of their growth. In fine weather they will grow so very quick, that you will have occasion to look over them once every fortnight or three weeks, if you wish to have them in good order. Never suffer the vines to run to-

* It is generally thought, in America, that when the vine ceases to bear, it is *worn out*, and should be thrown away. This is a great error, the failure in the crop arises solely from the want of proper management. A vine will live as long, and, perhaps, longer, than an oak; and the older it is, the better it is, both as to the abundance and the quality of its fruit. As a proof of this I need only mention the farmers vine at Hampton Court Palace, which is one of the curiosities that are shewn to strangers at that place. This vine was planted in the reign of King William, and it bore, in 1800, nearly two tons weight of grapes. Many gentlemen now in Philadelphia have seen this vine, and have received the same account of its product, the truth of which is well known in England. The stem is about three feet in girt, and the branches extend about sixty feet from the stem.

gether in a cluster, and to mat, which will infallibly ruin them for bearing the succeeding year. Top the shoots that have been trained in a serpentine manner, as soon as the grapes come to the size of very small green peas, a joint or two above the fruit; but never top the leading shoot, nor that which you intend should bear fruit next year.

I shall now give some directions for the second year's pruning.

I would never recommend the pruning of vines till the beginning of February, except in such a season as the present; for they are more forward now (in the middle of January) than they were last year in the latter end of March: This is owing to the fine autumn and mild winter, and the wood being so well ripened in the preceding summer. It is, however, very common with some to begin pruning soon after the fall of the leaf, before the wood becomes hard; but if a frost sets in before the wood is hard, in particular after wet summers and autumns, it will be very much injured*; I have frequently seen it almost killed after autumnal pruning. We often have fine weather in the months of October, November, and December, with sun and drying winds, which helps to ripen the wood after wet autumns.

When the vine leaves begin to fall, remember always to take a soft broom and sweep them off upwards in a gentle manner, which will be of great service in assisting to harden the wood.

When you begin to prune in February†, always make choice of the strongest and longest shoots, leaving them as long as you find the eyes good and plump, and the wood round; but by no means leave them when they become flat; as in that case they seldom bear fruit; and if they do, it will be very small. I never lay in any that has less than fifteen, and from that to thirty good eyes, according to the strength of the shoot, which will produce two bunches from every good eye. I have had seventy bunches of grapes from one shoot. The shoots that have borne fruit in the preceding year should be cut out next year, except when you want to fill the wall, and the shoots are very strong. You will always get plenty of fine healthy young wood if you are careful when you prune in the winter;

* This is the case in a much greater degree in America, where the weather is so much more intense. Great attention should be paid to this part of the directions.

† The reader will recur to what I have before said, respecting the *season* for pruning in America.

therefore never leave any but fine strong wood, always cutting at the second, third, or fourth eye; remembering to rub the lowest bud off, and that which comes out at the joint between the new and last year's wood. By these means you will get as much fruit from these short shoots as you would have by the common way of pruning. You must always observe to leave two or three of the strongest shoots for next year's bearing wood, and never top them. If you have not room to train them, you may lead them over the tops of the other trees, if the vines are planted against pears; or you may run them behind the standards, if there be any, which is generally the case when the walls are high; thus you will cover all the wall, which will have a very beautiful appearance when the fruit is ripe, besides furnishing a plentiful supply of fine grapes for the table. You may run the shoots over the top of the wall on the other side, provided the walls are low*. I also train them over the tops of trees on each side; which never does any harm to the trees below, provided you keep them nailed to the wall. I have also planted vines between trees on North and East aspects, and trained them over the tops of the South and West walls to fill the upper parts, till the peaches and nectarines cover them. I then cut away part of the vines, leaving only as many shoots as I may think necessary.

Two years ago I removed some old apricots that covered a wall about one hundred and sixty-five feet long, and planted them against a new wall, leaving five vines that were planted against the piers. These five plants have, in the course of two years, covered the above wall from top to bottom, and bear plenty of fine grapes every year. I also moved an old vine on a wall near to the above, and cut it in pretty close; it has in three years spread twenty-six yards, and bears very fine fruit.

Against one of the piers had been planted a Black Hamburgh Grape, and at the other side of the same pier was planted a Muscadine, at the distance of about two feet from each other; I pruned them both according to my method, and the second year after, they produced one thousand one hundred bunches of fine grapes.

* I saw an instance of this in Kensington Gardens, where the vines having filled the side of the walls, on which they were planted, had been trained, in the manner above described, over the other side of the wall, whence the fruit was hanging down in great abundance; and I understand it ripened very well, though to East and West aspects. In America grapes will ripen in almost any aspect, provided the stem of the vine has an aspect towards and point between South East and South West.

I also tried an experiment by taking some shoots from a South wall, opening the ground deep enough to lay them in across the foot path, at the distance of about four feet from the wall, and tied them to stakes, training them as espaliers*, laying in the wood as directed for walls, and keeping them as low as possible, that they might not shade the bottom of the wall; I also pruned them as I do those against walls, laying the shoots in very long, except those that were intended to bear fruit next year, from which I took off all the side shoots and runners against the wall and espaliers. In a favourable season these bear very fine fruit, better than what is got from the walls by the old method of pruning†.

Always observe to use the composition as soon after pruning as possible. As the vine is very porous, it soon imbibes the wet and moisture, which brings it quickly to decay.

If at any time a vine should be cut late in the season, it will be apt to bleed much; in that case the powder must be applied, repeating the application till the bleeding stops‡.

I cut two strong vine-branches in the month of June and three more in July, in very hot weather, on purpose to try the effect of the powder in stopping the bleeding. The sap rose so strong that it worked out at the top in a froth; I applied the powder, which in a short time entirely stopped it.

I shall now give some Directions for the Watering of Vines.

After the grapes are set and begin to swell, you may water them with the Barrow Engine, sprinkling them all over the leaves and fruit, pressing your fore-finger over the top of the pipe; by doing this you can throw the water as fine as small rain, which will wash all the dust off the vines and leaves, that are frequently covered with it, especially if the garden be near a public road, as is the case at Kensington. You should also wash the insects off the trees. In fine weather I sprinkle all the wall-trees three times a week, which keeps them clear

* An espalier is a tree, which is planted out in the open ground, and the branches of which are trained in a horizontal direction, and tied to stakes. These trees are never suffered to grow more than four or five feet high. Such a system of training *vines* would do very well for America.

† The fruit would always ripen well on espaliers, in America, where there is no want of sun and heat, which are so much wanted in England. I am persuaded that espalier vines would, were all the precautions taken, produce very well in any part of the Middle States.

‡ In America the vines bleed much more copiously than in England. If, therefore, the pruning be done after the sap begins to rise, great attention should be paid to the rules here laid down.

from insects, and promotes the swelling of the fruit; but this operation must never be performed when the nights are cold and frosty. You should begin to sprinkle the trees when the sun is in an oblique direction, or gone off the wall, which may be about four o'clock on a South aspect; by doing it at this time, the leaves will have time to dry before night, and so prevent the frost, if there should be any in the night, from injuring them. In very hot and dry weather, give the trees a good bottom watering once a week, which will forward the swelling of the fruit. Vines require a great deal of watering; but when the fruit is fully swelled, you should leave it off; particularly when the nights begin to get cold, as it would hurt the flavour of the fruit.

We shall say something in this place respecting the preservation of grapes from flies, wasps, and birds; but for more full directions on that head, see the chapter 'On Insects, &c.'

As soon as the large fly makes its appearance, you must provide plenty of bottles a little more than half filled with some sweet liquor to entice the flies to enter them, where they will be drowned. You must hang the bottles on the nails at proper distances all over the vines, and also place some of them at the bottom of the walls. The blue fly comes much earlier than the wasp, and you will find it no less destructive to the fruit. It will therefore be necessary to hang up the bottles betimes, in order to destroy as many of them as possible before the wasp makes its appearance, and have the bottles ready for this second enemy.

When the grapes begin to ripen, you will be troubled with other enemies; the birds will now begin to attack the fruit; it will then be necessary to bag some of your fine handsome bunches, but to bag them all would be an endless job, if you have a full crop and a large garden. I have had five men bagging for three weeks, and yet could not bag the half of what were on one wall.

Where the bunches are very thick, the quickest way is to cover the trees with nets, or buntine (a kind of stuff of which ships' colours are made), which will admit a free air to the grapes, and will dry soon after rain. They will also be a good covering for the trees in the spring, in cold, wet, or snowy weather. Always observe, that the bunches of grapes should be kept under the shade of the leaves till they begin to ripen; then you may begin to pick off the leaves which cover the fruit, (leaving those a little above it to be a shelter from the wet and frost in the nights; this will assist the ripening of the fruit; and take off only a few leaves at a time, according to the quantity

of grapes to be gathered at once: By these means your fruit will continue three times as long in succession as it would if the leaves were picked off all at one time.

I have often seen all the leaves taken off from the fruit soon after it was set, which prevents it from swelling, and the fruit will become hard and small, and will generally crack.

When the leaves are not too thick, they admit the rays of the sun to pass through, and a warm glow of heat will be reflected from the wall*.

You may find it convenient to let the grapes hang as long on the walls as you can: I have often let them hang till the middle of November, only covering them with nets or buntine.

When the frost begins to set in sharp, you should then gather the grapes. Where there are several bunches on one branch you may cut it off, leaving about six inches in length, or more, of the wood, according to the distance between the bunches, and a little on the outside of the fruit at each end; seal both ends with some common sealing-wax, such as Wine Merchants use for sealing their bottles with, which you may buy at the Wax Chandler's; then hang them across a line in a dry room, taking care to clip out, with a pair of scissars, any of the berries that begin to decay or become mouldy, which if left would taint the others: In this way I have kept grapes till the 6th of February; but, if they are cut before the bunches are too ripe, they may be kept much longer.

Having plenty of grapes in the winter makes a great addition for the table; and if properly kept, they will be of a much finer flavour than the Portugal grapes, which are generally at a very high price during the winter and spring.

Grapes may also be kept by packing them in jars (every bunch being first wrapped up in soft paper), and covering every layer with bran, which should be well dried before it is used, laying a little of it in the bottom of the jar; then a layer of grapes, and so on, a layer of bran and of grapes alternately, till you have filled the jar; then shake it gently, and fill it to the top with bran, laying some paper over it, and covering the top with a bladder tied firmly on to exclude the air; then put on the top or cover of the jar, observing that it fits as close as possible. These jars should be kept in a room where you can have a fire in wet or damp weather.

* The leaves must never be picked off, in America, where the sun itself burns them up but too fast.

CHAPTER IX.

OF FIGS.

Different Sorts described....Of Raising, Pruning, Training, and Sheltering Fig-Trees.*

THE Fig has been cultivated in England ever since the year 1762. Some of the oldest that we know of in this kingdom are in the Archbishop of Canterbury's gardens at Lambeth.

This genus of plants is arranged in the third order of Linnæus's twenty-third class, entitled Polygamia Triœcia.

The following are the Sorts best worth Cultivating in this Country.

1. The Brown, or Chesnut-coloured Ischia Fig. This is one of the largest that we have: It is of a brown or chesnut colour on the outside, and purple within; the grains are large, and the pulp sweet and high flavoured. It ripens in August; and, if planted against a hot wall, two crops may be obtained annually.

2. The Black Genoa Fig is a long fruit of a dark purple colour, the inside being of a bright red, and the flesh very high flavoured. It ripens in the latter end of August.

3. The Small White Early Fig. The skin of this fruit is of a pale yellow when ripe; the flesh is white and sweet. It is ripe about the latter end of August, or beginning of September.

4. The Large White Genoa Fig. This is a large fruit, the skin is thin and yellow when ripe, and red within. It is a good fruit, and is ripe about the latter end of August. This and the preceding bear two crops annually.

5. The Black Ischia Fig is a middle-sized fruit; the skin is almost black when ripe, and the inside of a deep red. The flesh is high flavoured, and the trees good bearers.

* I have never seen any fig-trees in America; but I have no doubt but, with the precautions here dictated, they would do very well.

6. The Brown and Black Small Italian Figs are cultivated in pots; the fruit is small, round and very delicious. I have gathered from one plant, in a twenty-four pot, two dozen of figs at one gathering.

7. The Malta Fig. This is a small brown fig; the skin of a pale brown, the inside of the same colour; the flesh is sweet and high flavoured. It is ripe in August and September.

8. The Murrey, or Brown Naples Fig, is a pretty large fruit of a light brown colour, and the inside nearly of the same colour; the flesh is well flavoured; and it ripens about the middle of September.

9. The Green Ischia Fig is an oblong fruit with a green skin; but being thin, is stained through of a brownish cast by the pulp when full ripe. The inside is purple, and the flesh high flavoured. It is ripe about the middle of September.

10. The Madonna Fig, commonly called the Brunswick, or Hanover Fig, is a large pyramidal fruit; the skin brown, the flesh a lighter brown, coarse, and has but little flavour. It ripens about the middle of September.

11. The Common Blue or Purple Fig is a large oblong fruit, ripens in August, and is a good bearer.

12. The Long Brown Naples Fig. The skin of this fruit is of a dark brown when ripe, the flesh inclining to red. It has large grains and a good flavour, and ripens about the beginning of October.

13. The Small Brown Ischia Fig is a small pyramidal fruit; the skin of a light brown; the flesh of a purple cast, and of high flavour. It ripens in October.

14. The Yellow Ischia Fig is a large fruit, the skin yellow, and the flesh purple and well flavoured. It ripens in October.

15. The Gentile Fig is of a middle size, roundish fruit, the skin yellow, and the flesh inclining to the same colour. It has large grains, and a good flavour; ripens very late, and the trees are but indifferent bearers.

There are also the following:

Best Early White,	Large Blue,
Black Provence,	Marseilles,
Cyprian,	Milward,
Ford's Seedling,	Small Black Ischia,
Green Naples,	White Ischia,
Large Black,	Yellow Cæsar.

Figs proper for a small Garden.

The Large White Genoa; Early White; Murrey Fig; Small Brown Ischia, and the Black Ischia.

In a good season, the Brown or Chesnut-coloured Ischia, the Black Genoa the Small White Early, the Murrey or Brown Naples, and the Common Blue, or Purple Fig, will ripen on standards.

Figs are raised from suckers, layers, or cuttings, and will thrive in almost any soil, but do not like a wet bottom; they generally produce more fruit on a strong loamy soil than on a dry one. Layers, or cuttings, are preferable to suckers.

Observations, &c. on Pruning Figs.

They should never be pruned in autumn or during the winter: the best time is at the latter end of April or beginning of May; by that time you will see what shoots have been killed by the frost in winter. The end of those branches more particularly will be hurt where the wood has not ripened well in autumn: They should be cut into the sound wood, and as near to an eye as possible. When the branches have been suffered to run up leaving the bottom quite naked, you should cut out every other branch as near to the ground as you can, which will furnish the wall with fine young wood; observing to stop the ends of the shoots in the beginning of June; this will cause them to throw out side shoots which will bear fruit the next summer. By that time you will have plenty of fine wood; you may then cut down the rest of the old branches that were left the preceding year, observing to prune them about the same time as you pruned last year: Always remember to pinch off the ends of the strongest shoots, except the leading ones, at the top bud.

When you prune in the spring, never shorten the shoots, as the fruit is produced near the tops. There will be a great many fine short side and fore-right shoots which should never be cut off but when they are decayed. These shoots will ripen much better than the long strong ones, and will not be so liable to be killed by the frost in winter. By following this method, you will have the trees covered with fruit from the top to the bottom of the walls, instead of having a few fruit only at the top, which is the case when the common method of pruning is practised.

When the figs are about the size of small nutmegs, you should pinch off the point of the top bud with your finger and thumb, or cut it with a sharp pen-knife; and always remember to use the powder, wherever you cut or pinch, to stop the

oozing of the milk, which, if suffered, would greatly exhaust and injure the trees.

Take care not to lay in the branches too thick; they should be from a foot to eighteen inches distant.

The trees must be covered in the beginning of winter before the frost sets in, otherwise the ends of the shoots will be hurt by the first sharp frost, before the wood is ripened and hardened, which will oblige you to cut them as before. When fig-trees are very much injured in hard winters, the best way will be to cut as near the ground as possible; and the second year you may get them into a fine bearing state, if you manage them as above directed.

I shall now give some directions as to the best method of covering them.

I generally cover them with bentings, or short grass, from the pleasure ground; which I find answers the purpose very well: After it is thoroughly dry, it may be put in a cock, covering it with straw to prevent the rain from penetrating into it, which will cause it to heat and rot; or it may be put into one of the sheds. If you cannot procure grass, get some dry moss. First cover the trees with laurel, yew, fir, or spruce boughs, and then tuck in the short grass or moss among the branches, beginning at the top of the tree, tucking in the grass, &c. as you descend, till you come to the bottom. Fern when well dried, makes an excellent covering. You may thatch the tree on the outside with the long leaves of the common fern; when you can get these, there will be no occasion for short grass. Fern, when it can be procured, which it may in most country places, will be found preferable to laurel.

Figs may also be sheltered in winter by wrapping hay or straw-bands round the branches of the trees; then open the ground, lay in the branches, and cover them over with mould about nine inches deep, leaving the ends of the shoots about three inches out of the ground, and covering the ground over with some rotten leaves, or old tan, &c. to keep out the frost: You may also cover the roots of the trees in the same manner.

If the walls are low, and the borders broad, you may bring all the branches front ways; but when the walls are high you can only bring the side branches forward in the above manner.

Some cover with reeds and straw; the latter I by no means approve of, as it is very apt to harbour rats and mice on account of some of the grain being left in it.

Be careful to observe, when you put on the grass, that no mice, &c. have got amongst it; and examine during the winter that no rats or mice get among the branches of the trees that are covered against the walls; if they do, they will infallibly bark the branches, and in that case you will be under the necessity of heading the trees down.

I would recommend setting traps, such as shall be described hereafter, near the roots of the trees, as soon as they are covered.

Take care not to uncover the figs too soon in the spring; and it should be done partially, as frequently there are frosts and cutting winds in the months of April and May, which will infallibly kill the young fruit as they make their appearance in the spring.

Those branches which have been laid into the ground should be taken up in the month of April, taking off the hay and straw-bands, and then nailed to the wall. Stick in among the branches some fern-leaves, or any other light covering, to protect them from the drying winds and frosts, till the fruit comes to the size of a large walnut, or rather till the leaves are sufficiently large to protect the fruit.

The Italians, when they wish to forward the ripening of figs, drop in a little sweet oil, from a quill, into the eye of the fruit; but care must be taken not to hurt the skin, which would make the fig burst. This will make a difference at least of a fortnight in the ripening.

As soon as the leaves begin to fall, brush them off with a broom, but by no means till they will come off easily. If they are forced off before they begin to wither and decay, the trees will bleed at the foot-stalks. At the same time you should clear the stalks of the small late fruit, which, if suffered to remain during the winter, will rot, and injure the tree so as to prevent it from bearing the ensuing summer. If you observe any milk oozing from the foot-stalks, use a little of the composition, which will stop it and heal the injured part. By doing this, you will assist the ripening and hardening of the wood before the winter frosts set in.

When you plant fig-trees, let them be from twenty to twenty-four feet apart, and train them horizontally, which will render them much more fruitful than when they are trained upright, which causes them to run up in long naked wood.

Observe also to leave spurs, or short shoots, all over the branches; and when the buds begin to swell, all the short shoots should be pinched, as before directed.

As the branches of standard fig-trees are very liable to be killed in severe winters, it will be necessary to lay them also in the ground, wrapping them up in hay or straw-bands, as before directed for wall-trees. It will be sometimes impracticable to lay down the middle branches; they must, therefore, be well covered with hay or straw-bands, and the outside ones laid down, going regularly round the tree, and taking particular care not to hurt them with the spade; then mulch them with rotten leaves, &c.

After hard winters, I have frequently been obliged to cut fig-trees down very near to the ground, and apply the composition: In the course of two years the new wood has covered over the old stump, and the branches filled up the former space, bearing also plenty of fine fruit.

In a plentiful year, when there are more than you want for the supply of the table, the remainder may be dried for winter use.

CHAPTER X.

OF QUINCES.

The best Sort for the Kitchen Garden....Of their Propagation, Planting, and Pruning....Of Bark-bound Trees, and of those which have rough Bark.

THE Quince is called Cydonia, from Cydon, a town of Crete, famous for this fruit.

It belongs to the fourth order of the twelfth class of the Sexual System, Icosandria Pentagynia. Linnæus has joined it to the apple and pear.

This is a very beautiful tree when in flower, and when the fruit is ripe in autumn. It was cultivated in this country in Gerard's time.

The best sort for planting in the kitchen garden is the Portugal, being the fittest for baking or stewing. It is of a fine purple colour when dressed, and is much better for Marmalade than any of the other sorts. The oblong kind, and the Apple Quince, are also planted in fruit-gardens; and there are several other sorts cultivated in the nurseries about town, and planted in shrubberies for variety and ornament. The Portugal sort is very useful to mix with apples for making pies and puddings; for when the apples are flat, and have lost their flavour, they add a quickness to them.

Of the Propagation and Pruning of Quince Trees.

They are easily raised by layers, or by cuttings taken from the tree in March (April for America). They should be planted in a shady place, in rows at about a foot distance from each other, and about three inches from plant to plant in the rows. Mulch them with rotten leaves, or rotten dung, which will keep the ground about them moist; and water them frequently in hot weather. About Michaelmas those that are well rooted may be planted out, and those that are not should remain another year. They may also be propagated by budding or grafting; and these trees will bear sooner, and be more fruitful, than those raised by any other method.

The Quince-tree may be pruned much in the same way as you would prune an apple-tree, taking care to cut out all the old deceased and dead wood, and the cross branches in the middle of the tree, which are apt to injure each other by friction. In general you will find old trees much hurt by injudicious pruning: In that case you must head them down, cut out all the cankery parts, and also all the deceased and dead wood where the tree is hollow, or where large branches have been cut or broken off, applying the composition as for apple-trees.

Quince-trees are very apt to have rough bark, and to be bark-bound: In that case, it will be necessary to shave off the rough bark with a draw-knife, and to scarify them when bark-bound; then brush them over with the composition, as hereafter directed.

I would however, advise to plant quince-trees at a proper distance from apples and pears, as bees and the wind might mix the Farina, and occasion the apples or pears to degenerate.

CHAPTER XI.

OF MEDLARS.

Different Sorts....Their Propagation and Manner of Treatment.

THE Medlar is ranged in the fourth order of Linnæus's twelfth class. Icosandria Pentagynia

The Different Sorts cultivated in this Country are,

The Great Medlar with bay leaves, and the Dutch Medlar. These, being the largest fruit, are generally cultivated in England. There is a smaller sort, which is a variety of that called the German or Dutch Medlar; the fruit is small; and the tree is more frequently planted in pleasure grounds than gardens.

The oriental sort, according to Mr. Philip Miller, is called the Dwarf Cherry of Mount Ida, in Crete, where the shepherds feed upon the fruit. It is large, roundish, and of a fine red colour when ripe.

There are several species now growing in the gardens of this country, that has been introduced from North America, which are very ornamental in pleasure grounds and parks, and to whose fruit the deer and birds are very partial.

They are raised from seed, or by grafting; those who wish to keep the sorts true, should propagate them by grafting on their own stocks.

The Medlar requires much the same sort of treatment as the quince-tree. Cut out all the dead and cankery wood; and, when they begin to get stunted, head them down, and apply the composition, as directed for apple-trees.

Medlars should hang upon the tree till they begin to rot, as those who are fond of this fruit never eat it till the pulp is quite soft. It may be proper to observe here, that those who wish to have their medlars large and fine, must keep the tree thin of wood.

As many people are fond of the fruit of the medlar, I would recommend planting some trees of the large Dutch sort

in the kitchen garden; the other sorts may be planted in pleasure grounds and parks.

There is a sort called the Nottingham Medlar, which is very much esteemed by some for its sharp and poignant taste.

Medlars, as well as quinces, should be planted at a proper distance from apple and pear-trees.

CHAPTER XII.

OF GOOSEBERRIES.

Different Sorts of Gooseberries; and the Weight of many large new ones from Manchester.....The Propagation, Planting, and Pruning of Gooseberries....A Method of Destroying Caterpillars.

THE Gooseberry and Currant are ranged by Linnæus in the first order of his fifth class, Pentandria Monogynia.

The Gooseberries common in this Country are,

Green Gascoin,
Smooth Green,
Early Black,
Small Early Red,
Large Smooth Dutch Yellow,
Hairy and Smooth Red,
Large Smooth Yellow,
Large Rough Yellow,
Common and Large White,
Champaigne.

A List of the largest new Sorts shown in Lancashire last Summer (1800), *with their Colour and Weight, communicated by Messrs. M'Niven, Nurserymen, Manchester.*

Red Gooseberries.	dw.	gr.
Alcock's King,	16	15
..... Duke of York,	16	1
Boardman's Royal Oak,	15	4
Brundrit's Atlas,	17	1
Chapman's Peerless,	15	21
Dien's Glory of England,	16	2
Fairlow's Lord Hood,	14	5
Fisher's Conqueror,	17	19
Fox's Jolly Smoker,	15	8
Hall's Porcupine,	13	20
Lomax's Victory,	16	11
Mason's Hercules,	13	16
Taylor's Volunteer,	16	17
Worthington's Glory of Eccles,	14	10
Yellow Gooseberries.		
Brundrit's Sir Sidney,	15	22
Davenport's Defender,	15	12
..... Creeping Ceres,	16	0
Hamnet's Kilton,	15	9
Hill's Golden Gourd,	13	17
..... Royal Sovereign,	17	10
Leigh's Prince of Orange,	15	0
Parkinson's Goldfinder,	14	5

October 27, 1800.

	dw.	gr.
Robinson's Crudus,	13	17
Withington's Sceptre,	13	7
Green Gooseberries.		
Blakeley's Chissel,	17	0
Boardman's Green Oak,	14	1
Brundrit's Tickle Toby,	14	6
Chadwick's Hero,	13	10
Dean's Lord Hood,	15	10
Mill's Langley Green,	16	2
Read's Satisfaction,	15	4
Robinson's Stump,	13	21
Smith's Green Mask,	13	20
Yates's Duke of Bedford,	14	11
White Gooseberries.		
Adams's Snow Ball,	12	22
Atkinson's White Hall,	14	8
Chapman's Highland White,	12	0
Davenport's Lady,	15	0
Gibson's Apollo,	14	20
Holding's White Muslin,	13	0
Kenyon's White Noble,	13	6
Moor's White Bear,	14	19
Woodward's White Smith,	17	2

In favourable seasons, many of the sorts in the foregoing list have been known to weigh more by several penny-weights.

The following List is taken from the Catalogue of Messrs. Kirk, Nurserymen, at Brompton, near London.

Supreme Red,
Perfection Red,
High Sheriff of Lancashire,
Royal George,
Unicorn,
Rough Amber,
White Walnut,
Ackerley's Double Bearer,
Royal Oak,
Miss Bold's,
Sparkler,
Ackerley's Rodney,
Hampson's Cæsar,
Monk's Charles Fox,
St. John,
Pigeon Egg,
Worthinglowe's Conqueror,
Golden Eagle,
Royder's Triumph,
Williamson's Yellow Hornet,
Swingham,
Jackson's Golden Orange,
Goliah Champion,
Warrington Red,
Golden Drop,
Costerdiner Goliah Champion,
Hairy Amber,
Nixon's Golden Eagle,
Worthington's White Lilly,
Laylord's Seedling,
Nixon's White Heart,
Riding's Old England,
Bakeley's Swingham,
Tillotson's St. John.

On the Cultivation &c. of Gooseberries,

Gooseberries are raised from cuttings, or from seed, and some raise them from suckers; but this last is not a good way, as bushes raised in this manner are more liable to throw out suckers than those which are raised from cuttings or seed.

The best time for planting cuttings is about Michaelmas, always cutting them from the strongest and cleanest shoots. The length of the cuttings should be from six to eight inches, planting them to an East or North aspect, at the distance of one foot from row to row, leaving them about three inches above ground. By planting at this distance, you will be able to hoe and keep them clear of weeds. Water them frequently in dry weather during the spring.

The Methods of Planting Gooseberries are various.

The Market-Gardeners about London plant them in rows from eight to ten feet apart from row to row, and six feet from plant to plant in the rows. In that case, I advise pruning them in the beginning of October, and the ground between may be planted with Coleworts or Beans for a spring crop; by so doing,

there will be no occasion to tread over the ground and hurt the coleworts in pruning the bushes; for, before the gooseberries begin to shoot, the coleworts will be all cleared off the ground.

After this time (or before if you find it convenient) lay a good coat of rotten dung on the ground; then dig it and plant early potatoes; but not so near to the gooseberries as to hurt them.

The roots of gooseberries should always be kept clear to admit the sun and air. In small gardens I would recommend planting them in a quarter by themselves, at the distance of six feet between the rows, and four feet from plant to plant; or you may plant them round the edges of the quarters, about three feet from the path; you will then have the ground clear for cropping, and a man, by setting one foot on the border, can gather the gooseberries without injuring the crop.

As gooseberries love a rich soil, they should be dunged every year, or at least have a good coat of dung once in two years.

Never plant them under the shade of other trees, as it will injure the flavour of the fruit.

Of Pruning Gooseberry-Bushes.

It is a practice too common in pruning gooseberries, to let them branch out with great naked stems, suffering them to remain in that state for years. When that is already the case, they should be cut down near to the ground in the winter pruning; this will make them throw out fine strong healthy shoots which will bear fruit the second year. Gooseberry-bushes, in general, bear their fruit on the second year's wood. Care should be taken in summer to keep the middle of the bush clear to admit a free air into them; leaving the finest and strongest shoots from six to ten inches distant from each other. This will help to ripen and harden the wood. It is a practice with some to shorten the shoots in the autumn or winter pruning: This should be always near to a wood-bud; which may be known by its being single, whereas fruit-buds are in clusters. The shoots may be shortened to eight or ten inches, according to their strength. Some leave them at full length for three or four years, thinning out those that are superfluous. Always leave a proper number to be trained up between the full length shoots, to succeed them when they are tired of bearing; then cut the old ones down to the young ones that are to succeed them. By these means you will always keep the bushes in a constant state of bearing.

You may observe, that those branches which were cut the first year, will in the second throw out short dugs, or spurs, which produce the fruit; and these should by no means be cut off, unless the branches are in a sickly state, and require to be cut close down (as is the case this year, 1800), when the bushes are overloaded with fruit. It will then be necessary to cut out a good deal of the old wood, to assist nature to recover herself after producing so great a quantity of fruit. This year the bushes are so loaded that the branches are bent down to the ground.

Gooseberries are well worth paying attention to, as they supply the table so amply till the other fruits come in.

There have been considerable additions made to them, of late years, from the great attention that has been paid, by the Gardeners and others of Manchester and its neighbourhood, to raising gooseberries from seed*.

Their catalogues now contain between four and five hundred sorts or varieties; but some are so near each other as hardly to be distinguished. By mixing up a rich soil to plant those in which have been raised from seed, and by watering, shading, and thinning the fruit, they have grown to a size much larger than any that had ever been seen in this country. They have made it their principal study to improve this valuable fruit, and have given great encouragement, by establishing societies for distributing prizes annually to those who raise the largest and finest new sorts. But it must be allowed, that some of the largest are much thicker in the skin, and not so well flavoured as some of the old sorts.

I enquired of Messrs. M'Niven, Nurserymen at Manchester, how many good and distinct sorts they could send me out of their numerous catalogue; they told me, that they could send about eighteen or twenty sorts, which they could answer for being good and distinct. I accordingly gave an order, and received all the sorts that they could warrant good, which turned out to my satisfaction.

Great attention should be paid to the cultivation of the early and late sorts. In some old gardens, in particular, there are very valuable sorts that have been of late too much neg-

* Such is the success of these unwearied endeavours, that it is now no uncommon thing to see gooseberries as large as pullets' eggs. It is very rare to see any of this fruit in America, where the sun is, indeed, rather too hot for them; but I have seen very tolerable gooseberries from the garden of Mr. Clifton in Philadelphia, and I am certain, that if the mode of cultivation here laid down were well attended to, and good sets got from England, great plenty of this valuable fruit might be raised in all the Middle and Eastern States.

lected: I would therefore recommend to those who live in the neighbourhood of such gardens, to observe their time of ripening, and to cultivate those especially which are early and late.

It is a practice with some to clip the tops of gooseberries with a pair of garden shears, as they would clip a thorn hedge; this I by no means approve of, as the fruit will not be half the size, nor of so fine a flavour, as when the bushes are kept clear of superfluous wood.

Care should be taken in spring and summer to stock, or grub up, all the suckers from the roots of the bushes, leaving their stems clear and unencumbered.

Many of the Lancashire sorts are apt to grow horizontally, and the branches frequently trail on the ground, which renders them liable to be broken by high winds, especially when they are loaded with fruit. In that case I would recommend two or three hoops to be put round them, to which the branches may be tied, to support them, and prevent their being broken by the wind.

Those who wish to have their gooseberries very late should plant on North walls and palings, between the other trees, and they may be removed when the trees begin to meet. If laid in thin, they will bear very fine and handsome fruit. I would advise to plant the finest late sorts; as by this method the table will be supplied much longer than by the common custom of planting in quarters.

Immediately after pruning, I always apply the composition to the ends of the shoots and cuttings; and I find it of great use in preventing the exhalation of the sap, and preserving the cuttings till they take root.

Gooseberries are very much infested with a small green caterpillar, which frequently devours both leaves and fruit.

You must, therefore, be very attentive, and observe their first appearance on the bushes; for, if not destroyed early, they will increase so fast, that they will soon devour all the leaves, and the fruit will then be good for nothing. They make their first appearance generally on the edges and undersides of the leaves.

Take some sifted quick-lime and lay it under the bushes; but do not at first let any of it touch the branches or leaves; then shake each bush suddenly and smartly, and the caterpillars will fall into the lime; if the bush be not shaken suddenly, the caterpillars, on being a little disturbed, will take so firm a hold as not easily to be shaken off.

L of C.

After this is done, sift some of the lime over the bushes; this will drive down those which may have lodged on the branches. The caterpillars ought to be swept up next day, and the bushes well washed with clear lime-water mixed with urine; this will destroy any caterpillars that may still remain, and also the Aphides, if there are any on the bushes.

CHAPTER XIII.

OF CURRANTS*.

Different Sorts of Currants,....Propagation, Planting, and Pruning of them....How to Preserve them from Insects.

CURRANTS, with Gooseberries, are arranged by Linnæus in the first order of his fifth class, Pentandria Monogynia.

The sorts most commonly cultivated in this country are, the Red and White Dutch Currants, and the Common Black, and American Black Currants.

The following Sorts are also cultivated by the Nurserymen about Town, and in other parts of England, viz.

Common Red,	Long-bunched Red,
Champagne Large Pale and Red,	Striped-leaved Red,
Fine New White Dutch,	White Crystal,
	Large Pale and Red Dutch.

The currant is the most useful of all the small fruit, either for the table and kitchen, or for preserving, making wine, &c. and continues longer in succession than any other. With proper management, currants will continue in use from June to November. Black Currants are very much esteemed by some; yet they are seldom sent to the table, but are very useful for making jelly, frequently taken for sore throats, colds, &c.†

* There are plenty of currants in America; but for want of attention to the mode of management, here laid down, they are greatly inferior both in size and flavour to the same sort of fruit in England.

† In Ireland, Black Currants are frequently steeped in whiskey, of which they make punch, and recommend it as a good medicine for coughs and colds. I once had two gallons of it sent me by a friend for that purpose; some of it was taken in a glass of warm water by a person who was very much afflicted with a severe cough, and thought to be in a decline, which effected a perfect cure in three or four nights.

The currants, for this purpose, should be bruised and put in a jar, and the whiskey poured over them: Let it stand for a week or fortnight, covering it

On the Propagation of Currants.

Currants may be raised from seed, layers, &c. When the trees are cut low, you may lay down some of the branches either in winter or spring, when the ground in the quarters or rows is dug, which should always be done annually. In the autumn following, these layers will have made fine roots; you may then plant them out where you wish them to stand, and they will bear fine fruit in the following summer.

Currants may also be propagated by cuttings, as gooseberries; always remembering to make choice of the strongest and straightest shoots.

Under the bushes that have been covered for late fruit, you will always find plenty of self-sown plants, which I would advise you to plant out by themselves. Those who make currant-wine may save the seed, after the fruit is squeezed, and dry it: It may then be sown in autumn, or early in the spring, on a bed of fine light earth; by which you will, most probably, obtain some fine varieties. By no means propagate them from suckers, as they never grow handsome, and are very liable to throw out a great many suckers.

In many gardens there still remains a small sort of red and white currant not worth cultivating; I would therefore advise those who have any of them in their gardens to root them up, and plant in their room, the Large Red and White Dutch, the Long-bunched Red, and Champagne Large Pale Red..... Currants may be planted out in the same manner as gooseberries, either in quarters or single rows round the edges of quarters.

I would particularly recommend planting a few against a South or West wall, or paling, which will produce fruit much earlier than in the open ground. Also to plant some between other fruit-trees on North walls, or palings, for latter crops; these may be covered with double nets, to preserve them from birds; tucking in a few fern branches between the two nets, which will prevent the heat of the sun and drying winds from shrivelling the fruit. In open ground they should be covered with mats for the same purpose; at the same time permitting all the leaves to remain on the bushes, to shade the fruit and make it keep the longer.

close down; then strain it through a fine cloth or sieve, and put it in bottles or casks for use. Currants may be used in this manner with brandy, gin, or any other spirits. They may also be preserved as cherries, and sent up to table.

W. Forsyth.

Pruning of Currant-Bushes.

The pruning of currants is nearly similar to that of gooseberries. You may begin in the month of November, and continue till March, as it suits your convenience.

Currants should never be left too thick of wood; and a great deal depends on the management of them in summer, to have strong and fine wood for the following season. If they have been neglected for some years, and suffered to run up to long naked wood, they must be cut down near the ground; they will then set forth fine strong shoots. In this case, I would recommend heading down every other tree, and cutting the others partially, by taking out every other branch as near as can be to the ground, unless they are trained up with single stems, in which case it will be necessary to cut them as near as possible to where the branches begin to break out and form the head.

In the winter pruning, (in America, this may be done any time between November and the middle of April) you must preserve the strongest and finest shoots, leaving them from nine to eighteen inches long, according to their strength, and from eight to ten inches apart, and as regular as possible from top to bottom of the tree; taking care to cut out all the dead and weak shoots. Pay particular attention in summer, and keep the middle of the bush open to admit the sun and air; preserving the finest and strongest shoots that are nearest the stem. Some are fond of training them up with single stems, to a considerable height, to form fine round heads, which are very ornamental, if not suffered to run up too high; as in that case they are liable to be broken by the wind, if not well supported by stakes. Care must be taken not to let the shoots run to more than six inches long; because such short shoots will not be so liable to be damaged by the wind as long and weak ones are, especially when loaded with fruit. I prefer dwarfs from three to four feet high.

The same manner of pruning &c. will do for Black Currants; but, as they grow stronger than the Red or White, the shoots should be left thinner, and laid in longer, which will make them produce larger and finer fruit.

Those against walls and palings should have the shoots laid in thinner than those in the quarters, and trained as horizontally as possible, shortening them in the winter pruning, to a foot or eighteen inches, according to the strength of the shoots.

As currants are very liable to be devoured by ear-wigs, which take shelter under their leaves and branches, bundles of

bean-stalks should be hung up some time before the bushes are covered with mats or nets. If proper attention be not paid to this, the fruit will generally suffer very much from these insects. After the bushes are covered, take the mats off once in three or four days, and kill the ear-wigs that have got into the bean-stalks, which it will be necessary still to keep hung up. As there is a sweetness in the inside of bean-stalks, which attracts the ear-wigs they very readily take shelter in them from rain.

By paying proper attention to the foregoing directions, you will be able to keep these destructive insects under, and preserve the greater part of the fruit.

Be particularly careful to pull up all suckers at the roots of the trees, and keep them as clean as possible; otherwise the suckers will prevent the sun and air from penetrating to the roots, and greatly weaken the trees.

What has been said above will, I hope, be sufficient to direct those who are fond of cultivating this valuable and useful fruit.

Currants are very liable to be infested with aphides and other insects, which shall be taken notice of in another place.

CHAPTER XIV.

OF RASPBERRIES.

Different Sorts of Raspberries; and of Propagating, Planting, Watering, Staking and Pruning them.

RASPBERRIES are a very useful fruit for the table; for preserving, for making of jam, sauce, &c. and continue a long time in bearing.

The Raspberry belongs to the fifth order of Linnæus's twelfth class, Icosandria Polygynia, and is a native of England.

The following are the Sorts cultivated in this Country.

Early White,
Double-bearing White,
Large Common White,
Large Red,
Large Red Antwerp,
Large White Antwerp,
Smooth Cane Double-bearing,
Woodward's New Raspberry.

Of Propagating, Planting, and Pruning Raspberries.

Raspberries are raised from suckers and layers.

They should be planted in a piece of ground by themselves, and (except the Early White) at the distance of about six feet from row to row, and four feet in the rows.

The ground should first be well trenched and dunged, before the raspberries are planted. Make choice of the strongest and finest plants that come out from the sides of the stools, where they have been standing for some years; or encourage the strongest plants that come out betwixt the rows after digging, which should be done annually. In digging the ground, you will frequently happen to cut the roots with a spade, which will occasion a great number of small plants to come up; of these select the strongest and finest, and hoe up all the superfluous ones. But I prefer laying down some of the strongest outside shoots in the month of March; as by the following autumn they will make fine roots, and may be planted out in a quarter or piece of ground where you intend them to remain.

These will not be so liable to throw out suckers as those which are produced from suckers.

When you plant out fresh pieces of raspberries, it should be done in moist weather, as the roots are very delicate, and liable to be hurt when exposed to a dry air. If, however, they are planted in dry weather, take care to moisten the roots with water, and cover them with wet litter, or leaves, during the time of planting.

In planting, open a trench with the spade along the line where the suckers or layers are to be planted; cut off all the small fibry roots with a knife, leaving only the stronger roots; put them into the trench, and cover them with some earth; then water them well, and throw the remainder of the earth over them, letting them remain till you have finished planting the piece; then, where you first began to plant, begin and tread the ground with your foot as hard as you can along each of the trenches, and in the same direction as you planted: Then with a spade level all the ground smooth, and run it over with a rake, taking off any stones and rubbish that may be left on the surface.

In dry weather, the plants should be watered two or three times a week till they have taken root. It will be necessary to stake the Antwerp, and other strong-growing sorts, with stout stakes; then run a couple of small rails at the top, to tie the branches to; which will prevent their being broken by the wind, or beaten down by the rain. The Early White and smaller sorts may be plaited together at top, tying them round with the small yellow willow, which will keep them together. Some of the early raspberries may be planted between the trees on a West aspect, to produce early fruit before those in the open ground come in. The Antwerp will thrive exceedingly well against North walls or palings, and will produce late crops. Such as are planted against walls or palings should be tacked to them.

Where you find any of the Small Red and White Raspberries, destroy them, and plant the following sorts in their room, viz. the Large Red, the Smooth Cane Double-bearing, the Large Red and White Antwerps, the Large Common White, the Double-bearing White, and Woodward's New Raspberry.

Some prefer pruning raspberries in autumn, a practice of which I by no means approve. As they bear the fruit on the wood of the preceding year, they are very liable to be killed by the frost in severe winters; but, by deferring the pruning till the month of February (March, for America,) you will

have great choice of fine wood for bearing the following summer; remembering to root out, or cut down all the wood that bore fruit the preceding year, which generally dies; selecting only from five to seven of the most vigorous and strong shoots from the last year's wood, to bear fruit the ensuing season. These shoots may be pruned to the length of three or four feet according to their strength, if they are of the Smooth Cane Double-bearing sort (which generally bears a second crop in autumn, and will in fine seasons continue bearing from June to November); but, if the Large Antwerp, the shoots should be left five or six feet long.

The Early White, which never grows so strong as the above sorts, should be shortened to two feet and a half, or three feet. These should be planted in rows about three feet distant from each other, and two feet from plant to plant in the rows; always remembering to keep them clear of suckers, and to cut out the dead, or last year's wood, as before directed; making choice of the strongest shoots for bearing-wood. But be careful not to cut off the little spurs on the sides, which bear the fruit.

Raspberries will continue in bearing five or six years; by which time you should have a fresh plantation to succeed them. The young plants will bear some fruit the first year, and come into full bearing the second year after planting. If they be suffered to remain more than five or six years on the same ground, they will degenerate and bear small fruit. Care should be taken not to leave above eight or ten of the strongest shoots, rubbing off or pulling up all the superfluous ones; and to keep the ground well hoed and clear of weeds between the rows.

CHAPTER XV.

OF BARBERRIES.

The Different Sorts, and their Culture.

THE Barberry is useful for preserving and pickling, and for garnishing of dishes; the trees also have a fine effect in shrubberies and pleasure grounds, being beautiful flowering shrubs. In autumn and winter they have a delightful appearance, from their various-coloured fruit. I would, therefore, recommend planting them in all shrubberies and pleasure grounds. Those who are fond of the natural harmony of singing-birds will find Barberries well adapted for attracting them to the spots where they are planted, most birds being very fond of them. They should not, however, be planted near the sides of public walks, as the flowers emit a very strong and rather disagreeable smell.

The Barberry is ranged, by Linnæus, in the first order of his sixth class, entitled Hexandria Monogynia.

The following Sorts are most esteemed for their Fruit, &c.

1. The Red Barberry without stones, which has an agreeable flavour when full ripe.
2. The White Barberry.
3. The Black Sweet; which is the tenderest of them, and should be planted in a warm situation.
4. The Common Red with stones. This is planted more for ornament than use, on account of its beautiful red berries.

The Barberry is a native of England.

Of Raising and Pruning Barberries.

Barberries are very easily propagated from suckers and layers, and require the same management in pruning as other flowering shrubs. I would always recommend planting them in pleasure grounds, and not in kitchen gardens. On grass lawns, in pleasure grounds of small extent, they have a fine appearance, and are frequently planted in such situations as ornamental flowering shrubs; they are also planted frequently in clumps.

When you wish to increase them, encourage the finest and cleanest shoots in summer, by trimming all the side branches off thin; and when you dress the shrubberies in winter, lay down the strong shoots, which will take root, and be fit to transplant in autumn following. When designed for use, they should be trained up as standards and half standards, and they will grow from six to twelve feet high. In summer, trim off all the straggling and superfluous shoots; so as that they may make fine handsome heads.

Barberries may also be raised from seed; but suckers and layers are best for preserving the sorts distinct.

CHAPTER XVI.

OF MULBERRIES.

Different Sorts cultivated in England....Propagating, Planting, and Pruning of them....Of Restoring old and decayed Trees.

THE Mulberry, *Morus*, is a native of Persia; whence it was introduced into the Southern parts of Europe, and is now commonly cultivated in England, Germany, and other countries where the winters are not very severe. It is ranked in the fourth order of Linnæus's twenty-first class, Monœcia Tetrandria.

We are informed, that mulberries were first introduced into this country in 1596; but I have reason to believe, that they were brought hither prior to that period, as many old trees are to be seen standing at this day about antient monasteries and abbeys; from which it is at least probable, that they had been introduced before the dissolution of those houses.

Four large mulberry-trees are still standing on the site of an old kitchen garden, now part of the pleasure ground, at Sion-House, which, perhaps, may have stood there ever since that house was a monastery. The late Duke of Northumberland has been heard to say, that these trees were above 300 years old.

At the Priory near Stanmore, Middlesex (the seat of the Marquis of Abercorn), there are also some antient mulberry-trees. The priory was formerly a religious house.

In a very old garden at Chelsea, which belonged to the late John Browning, Esq. (who was a very good botanist, and had a large collection of trees and plants) there is one of the largest mulberry-trees that I ever saw, and which appears to be extremely old.

Gerard, who published his History of Plants in 1597, says, in that book, that mulberry-trees then grew in sundry gardens in England.

Those commonly cultivated in this Country are,

1. The Common Black Mulberry-Tree, which is much esteemed for its delicate fruit. This is now common in most parts of Europe, except where the winters are very severe. There is a variety of this with jagged leaves, and smaller fruit; but Mr. Miller says, that it is a distinct species, a native of Sicily; and that the fruit has no flavour; consequently, it is not worth cultivating. There were some of these trees in Chelsea Gardens.

2. The White Mulberry. This tree is raised in great abundance in Italy, and other Southern countries, for the leaves, to feed silk-worms*; though it is said that the Persians generally use the Common Black Mulberry for that purpose; and this latter is the only sort raised for the sake of its fruit, which is very wholesome.

3. The Red or Virginian Mulberry-Tree, which grows to a considerable height, and bears reddish berries.

The two last are cultivated, in this country, only for the sake of variety.

Mulberries are raised from seed, or propagated from cuttings and layers.

Those raised from seed have frequently male flowers, and produce no fruit; these, therefore, should never be made choice of for fruit-bearing trees, unless they have been seen to bear in the nursery.

The best bearing branches of old trees are to be chosen for cuttings and layers; for some branches of these trees produce only katkins, and trees raised from them will never produce fruit. If they are to be raised from layers, they will generally take root sufficiently the first year to bear separating from the parent tree, and should then be planted in a nursery, and trained up with single stems. In four years they will be fit to plant out where they are to remain. They should be planted at a proper distance to admit the sun and air, as the fruit, when the trees are too close, is very apt to turn mouldy; they should also be sheltered from the East, North, and West winds.

But the best way of raising mulberries is from cuttings of the former year's shoots, having one joint of the two years' wood. Plant them out in autumn, if fine weather, or in the month of March, in rows nine inches apart, and at the distance

* This tree possesses the peculiar property of breeding no vermin, either while growing or when cut down; neither does it harbour any caterpillar, the silk-worm excepted. Evelyn's Sylva, by Hunter, vol. 2. p. 40.

of two inches in the rows, leaving only two or three buds above ground: Mulch the ground with leaves or dung well rotted, to keep it moist, and the plants will require little watering. If they succeed well, they may, next season, be transplanted into a nursery, and treated as directed for layers. These young trees, while they remain in the nursery, should be transplanted every three or four years.

I would recommend planting of mulberries in grass orchards and pleasure grounds, because the finest of the fruit, when ripe, frequently drops, which, if it fall on dug or ploughed ground, will be soiled and rendered unfit for use, as the earth will adhere so to the fruit as to render the cleaning of it impracticable; but if planted on lawns, or in grass orchards, the fruit can be picked up without receiving any injury. Another reason for planting these trees on lawns or in orchards is, that, when full grown, they are too large for a kitchen garden. The soil in which they thrive best is a rich, light, and deep earth.

As the fruit is produced on the young wood, you should cut out only such branches as cross others, and such as are decayed, or broken by any accident; at the same time apply the composition. If, however, the heads should become too full of wood, it will be necessary to thin them, as the fruit is larger and better flavoured where the heads are kept thin of wood.

I have found many of these trees in a very decayed state, with the trunks quite hollow; and have tried the efficacy of the composition on several of them, cutting out all the dead wood and cankery parts of some, and heading down others that were stunted and sickly. After these operations they put forth vigorous branches, and bore excellent crops of fruit, more than double the size of that which they produced in their former state.

I would advise those who have any old decayed mulberry-trees, to treat them in the same manner; but those which are very much decayed should be headed down; this will throw them into a healthy bearing state, and in two or three years they will produce plenty of fine fruit.

In the lawn in front of the house of John Grove, Esq. at Little Chelsea, there are four old mulberry-trees, which a few years ago were so very much decayed, and so full of wounds and dead wood, that they produced very little fruit, and that of a small size. I had all the decayed and rotten wood carefully cut out, and the branches trimmed, and then the composition applied. In the first season they sent forth fine shoots, and in the second produced plenty of fruit, of a better flavour and double the size of that which they formerly bore.

As old mulberry-trees produce not only a greater quantity of fruit, but also much larger and of a finer flavour, than young ones, it is well worth while to take some pains to repair the injuries which they may have sustained by accidents or age.

I am sorry to say, that this pleasant and valuable fruit is but very little cultivated in this country*.

* Gerard, in his description of the mulberry-tree, has the following curious paragraph....." Hexander in Atheneus affirmeth, that the mulberry-trees in his time did not bring forth fruit in twenty years together; and, that so great a plague of the gout reigned and raged so generally, as not only men, but boys, wenches, eunuchs, and women, were troubled with that disease."

CHAPTER XVII.

OF THE SERVICE.

The Cultivated Service, the Wild Service, and the Maple-leaved Service; with their Culture.

THERE are three sorts of the Service-Tree cultivated in England, viz. the Cultivated Service, the Wild Service, or Mountain Ash, and the Maple-leaved Service. The first is a native of the warmer climes of Europe; and the other two grow wild in different parts of England.

The Service belongs to the twelfth class of Linnæus's System, entitled Icosandria Trigynia.

Of the Cultivated Service.

This tree is well worth cultivating, both for its fruit and for ornament. It is beautiful in the month of June when in flower, and the fruit in autumn has a fine appearance, and grows to a large size if the trees be kept thin, and not over-loaded with wood. They may be planted in orchards among other fruit-trees; for, as they flower much later than apples and pears, there will be no danger of the Farina intermixing with theirs. They may also have a place in plantations in the pleasure grounds, or singly on the lawn, or in the rows by the sides of gravel-walks: In this case, they should be trained with straight stems eight or ten feet high, and all the straggling branches should be cut in, to assist them in forming handsome round heads. These trees may be intermixed with thorns, and will have a very good effect.

We have only two sorts cultivated in the garden; viz. the Apple-Shaped, and the Pear-Shaped Service-Tree.

These trees are propagated from seed, layers, and cuttings. By raising them from seed you may perhaps obtain several varieties; but the best method of preserving the sorts, when you have fine varieties is by grafting or budding.

Train the stem, if for standards, six or eight feet high; but if for dwarfs, about three feet high; which latter may be

planted in shrubberies. The fruit, when ripe, may be gathered and put in the fruit-room; letting it remain till nearly in a state of decay: It will make a variety when served up to table among the autumn fruits.

The wood of this tree is very useful for making picture-frames, toys, &c.

When the trees are pruned, and where there are any decayed parts, the composition should be applied.

Of the Wild Service-Tree, or Mountain Ash.

The Wild Service is sometimes planted in orchards among fruit-trees; but I would recommend planting it in pleasure grounds, plantations, or on lawns, for ornament, where the different varieties of the fruit have a beautiful effect in autumn; and the fruit gathered, when full ripe, and laid by some time to soften, has a very agreeable acid taste.

The seeds, when properly dried, may be sown in autumn in beds of light mould; taking care to keep them free from weeds in summer. In the following autumn they may be transplanted into beds, or quarters (according to the number which you may wish to plant), and trained either for dwarfs or standards.

By selecting the largest and finest fruit many varieties may be obtained from the seed; they may also be propagated from layers; but those who are fond of having a great variety, and keeping the sorts true, should graft them.

If trained up with straight clean stems, service-trees will grow to the height of thirty or forty feet; in that case they should be planted among forest-trees, or on the back parts of large shrubberies. But those who wish to plant them as flowering shrubs must head them down when young, to make them throw out horizontal shoots; they may then be planted among the middling-sized shrubs, which will make a beautiful variety, both when in flower and when bearing fruit.

Wild service-trees* grow to a considerable size when properly managed, and are very much used by wheelers, &c. on account of the wood being all, what they call, heart-wood.

Of the Maple-leaved Service-Tree.

This tree grows wild at Paddington, and in other parts of England, and is frequently forty or fifty feet high, with a large spreading head, making a fine appearance, and deserves a place among forest-trees and in extensive plantations and gardens.

* The fruit of the wild service is excellent food for game and other birds.

It bears large bunches of white flowers, succeeded by clusters of brown fruit, which, when gathered full ripe, and laid by for some time, till it becomes soft, has a very agreeable tart flavour.

This tree may be raised from seed, which should be sown in autumn, or by layers; but those who wish to raise them in the dwarf state should graft them very low, and train them from six to eight feet high. Some graft them on white thorns; but I prefer their own stocks. If these dwarfs are trained up with fine heads, they will have a very good effect in shrubberies. If intended for standards, train them up as high as you can: They will have a beautiful appearance in the back parts of shrubberies. They may also be trained without grafting, and planted on lawns for ornament. Some train them as espaliers; but this I do not approve of, as they are not so ornamental, neither do they bear so well.

The wood of this tree is also very useful for mechanical purposes.

CHAPTER XVIII.

OF THE ALMOND.

Different Sorts of Almonds; their Propagation, and the Method of Pruning them....How to keep them during Winter.

THE Almond belongs to the twelfth class of Linnæus, Icosandria Monogynia, being joined with the Peach, and was introduced here in 1570.

Almonds are beautiful trees for planting in shrubberies and plantations, and deserve a place in every pleasure ground, on account of their coming so early into bloom, and for the use of their kernels.

The following are the Sorts propagated in this country for Ornament and Use, viz.

The Tender-shelled Almond, the Sweet Almond, the Common or Bitter Almond, the Sweet Jordan Almond, the Hard-shelled Almond, the Dwarf, and the Double-flowering Almonds. The last two, being beautiful early flowering shrubs, are planted for ornament only.

Almonds are propagated by budding them upon plum, almond, or peach stocks. The next spring you may train them for standards, or let them grow for half standards; but the common way is, to bud them as high as you wish the stem to be; and the second year after they may be planted out for good. If you are to transplant them into a dry soil, let it be done in October, when the leaves begin to decay; but if into wet ground, the month of February is the proper season. Almonds budded on plumb stocks thrive best in a wet soil, and on almond and peach stocks in a dry.

When the young trees are brought from the nursery, they should never be cut till the young shoots begin to break.....as directed for peaches and nectarines.

Almonds require nearly the same management in pruning as standard apricots. After wet autumns, when the wood is not well ripened, hard winters are apt to kill the shoots;

in that case, they should be cut down to the sound wood; taking care to cut out the cross shoots that rub against others, leaving the tree open in the middle, pruning the shoots about the same length as apricots, and according to their strength. Never omit cutting out all the cankery parts, and decayed wood.

Some plant these trees out as standards, and others as half standards, according to the ground and situation; always taking care to plant them in a sheltered place facing the South, intermixing them in the back of the shrubberies with the taller flowering shrubs: Or they may be planted on lawns for ornament, as they make a very beautiful appearance when in flower, or bearing fruit. If planted as dwarfs, they may be covered with poles stuck into the ground, thatching over the tops of the trees with some fern, or any other light covering, which will prevent the blossom from being killed by the frost in February and March. After the fruit is set, and the leaves so far out as to cover it, if fine weather, the covering may be removed in the latter end of April or beginning of May, which will ensure a plentiful crop of almonds; a very useful supply for the table in autumn and winter.

Those who have plenty of walling sometimes plant almond-trees on walls, and sometimes on espaliers.

Almonds may be preserved in dry sand, or bran, for use; but they must be thoroughly dried on shelves, or boards, in an airy place before they are put into the sand or bran, otherwise they will get mouldy. They are preserved only for their kernels, the other part of the fruit being of no service.

CHAPTER XIX.

OF FILBERTS AND HAZLE-NUTS.

The Sorts commonly cultivated in England....Method of Culture.... How to keep them in Winter.

FILBERTS and Hazle-Nuts grow wild in woods and hedges, and are brought in great quantities to the London markets, and to those of other large towns throughout the kingdom; employing a great many poor families during the autumn, who otherwise might have very little to do, and of course be a burden on the public.

This genus of plants is ranged in the eighth order of Linnæus's twenty-first class, Monœcia Polyandria.

The Sorts generally cultivated in England are the following,

1. The Large Cob Nut.
2. The Large Long Nut, which produces very fine large fruit.
3. The Barcelona, or Spanish Nut, with large cups.
4. The Common Wood Nut, with red skinned kernels.
5. The Filbert with white kernels.
6. The Filbert with red kernels.
7. The Large Cluster Wood Nut.

Of Propagating and Pruning Nut-Trees.

Filberts and nuts of all kinds are propagated from seed, layers, and suckers; but those who wish to have fine sorts should graft the trees, or lay down in March some of the straightest shoots, notched at a joint, pegging them into the ground; then cover them with earth about three inches thick, making basons round them with edges of mould about two inches higher than the surface of the ground, to prevent the water's running off; water them sometimes in dry weather, and mulch them with some rotten leaves, to keep them moist. By the following autumn they will be fit to take up and plant out in beds in the nursery, where they should remain about two years, planting them out in August where you wish them to re-

main for good. If any of the layers have not taken proper root, they may be left till the autumn following.

Filberts and nuts may be planted on the outsides of woods, or in the back parts of shrubberies and pleasure grounds, or in large kitchen gardens, in shady walks; or for the purpose of hiding sheds, cisterns, &c.

When they are raised from seed, it should be sown in autumn, in a light earth; and it will be necessary to cover the beds all over with slates, flat stones, or bricks, to prevent the mice from eating the nuts or carrying them off in winter.

When at the Botanic Gardens, Chelsea, I once sowed several quarts of Large Barcelona Nuts, in pots, in two frames at a considerable distance from each other, the nuts were all carried off by the mice in one night. On searching round the lining of a frame where we kept green-house plants in winter, I found above a quart of the nuts in one hoard, which I again sowed immediately, covering them over with slates; from these nuts I raised some very fine plants.

The Barcelona Nut-Tree is rather scarce in England, but it is well worth cultivating; it is a distinct species, and grows to a fine timber tree. The nuts that I sowed, as mentioned above, were produced from a fine tree in the Botanic Gardens at Chelsea*.

Those who are not in possession of plants may procure them from nuts fresh imported from Spain, by sowing them as above directed. Great quantities are imported annually under the name of Barcelona, or Great Spanish Nuts.

When in the nursery, nut-trees should be trained with single straight stems, to form fine heads from three to six feet high; cut off the leading shoot at the height you would have the head formed, rubbing off all the lower buds, and leaving only as many at top as you think will be sufficient to form a handsome head, and according to the strength of the stem.

Nuts, when intended for keeping, should be well dried and packed in jars or boxes of dry sand (and placed in a fruit-room, or dry cellar), well covered down to preserve them from mice.

The shoots of filberts and nut-trees are very useful for stacking green-house plants and raspberries, or for making withes to bind faggots, and for sticking pease†.

* This tree, at two feet and a half from the ground, measures about four feet in circumference.

† I have often been astonished, that those who have gardens in America, should pay so little attention to fruit of this sort. The nuts, which are natives

of the Middle States, are excellent, even in their uncultivated state, where they have to contend with every possible disadvantage. They are something between the English hazle-nut and the filbert, and, with a little care, might be rendered very productive and profitable. They are much better than the Spanish nuts, which are sold at Philadelphia for a shilling sterling a pint, or thereabouts; and yet no pains are taken to cultivate them. Our sorts, too, might be obtained at a very small expence. I have sent several plants to my friends at Bustletown, which, I hear, grow very well; and I have lately sent them some of the finest hasle-nuts I ever saw, and which I got from the garden of Joseph Galloway, Esq. at Waterford. If these succeed, I hope it will be an inducement for others to obtain a like supply.

CHAPTER XX.

OF CHESNUTS.

Different Sorts cultivated in England.....Chesnut-Trees are excellent Timber.....How to Propagate, Plant, and Head them.*

THE Chesnut, Castanea, is a native of the South of Europe, and is said to take its name from Castana, a city of Thessaly, were antiently it grew in great plenty. It belongs to Linnæus's twenty-first class, Monœcia Polyandria.

The sorts mostly cultivated in England are those commonly called Spanish Chesnuts, which run into great varieties when raised from seed; and a sort called, in America, Chinquapin, or Dwarf Virginian Chesnut; but this is only raised for the sake of variety.

The former are very fine trees, and well worth cultivating both for use and ornament. The timber is reckoned equal to oak, and, for making casks, even superior to it; as, when seasoned, it is not so liable to shrink or swell as oak. These trees have also a very noble appearance, and are therefore very fit to plant in parks, &c.

Gerard says, that in his time there were several woods of chesnuts in England, particularly one near Feversham in Kent; and Fitz-Stephens, in a description of London written by him in Henry the Second's time, speaks of a very noble forest which grew on the North part of it. This tree grows sometimes to an amazing size. Not to mention those abroad, there is one at Lord Ducie's at Tortworth, in the county of Gloucester, which measures nineteen yards in circumference, and is mentioned by Sir Robert Atkyns, in his History of that county, as a famous tree in King John's time; and by Mr. Evelyn, in his Sylva, book 3d, chap. 7, p. 233, fourth edition, to have been so remarkable for its magnitude in the reign of

* I particularly request the American reader to pay attention to what is hereafter said about the preservation of the fruit of the chesnut.

King Stephen, as then to be called the Great Chesnut of Tortworth; from which it may reasonably be supposed to have been standing before the Conquest. Lord Ducie had a drawing of it taken and engraved in 1772. One of the prints is now in my possession*. Formerly a great part of London was built with chesnut and walnut-tree; and at Sion House, the seat of the Duke of Northumberland, the stables are built with them, from the old monastery at that place, which was taken down when the present mansion-house was built.

The best way of propagating chesnut-trees is from seed, gathered when thoroughly ripe; which is generally about the latter end of October; but they should not be gathered till the husks begin to open, and the nuts appear of a brownish colour; they will then drop of themselves, and should be carefully picked up in the morning; and particularly after high winds; those which are intended for eating, or for seed, should be always suffered to drop of themselves; they will be found much better than those that are beaten down. If, however, the frost should set in early, you will be under the necessity of thrashing them down, which should be done in a dry day. All that fall in the husk should be thrown in heaps in a shed, or other convenient place, and suffered to remain three weeks, or a month, in that state, to ripen. They should then be taken out of the husks, and the best picked out and laid up by themselves, after being well dried, on mats, or cloths, in a sunny situation. They should be laid up in the fruit-room, or granary, on shelves, or on a dry floor. Remember to turn them frequently. The inferior ones will do for sowing, or they may be given to pigs or turkeys, who are very fond of them; they will be found very good for fattening poultry, especially turkeys. If during the winter they should become damp or mouldy, they should be turned and carefully wiped; and if spread at a moderate distance from a fire, or dried in an oven after the bread is drawn, and then packed in boxes, or jars, with thorough dry sand, they will keep

* At Ashted-park, near Epsom, the seat of Richard Howard, Esq. there are a great many Spanish Chesnuts, that were sown by a gardener now living, one of which, at three feet from the ground, measures seven feet in circumference, and has a trunk upwards of fifty feet high.

Since writing the above, I have seen the old gardener, Thomas Davie, who is now 77 years old, and have had some conversation with him. He says, that at the age of 15 he bought three shillings worth of chesnuts in London on purpose to treat his fellow-servants; but finding that they would not accept of them, he sowed them in a bed in the garden at Ashted, which then belonged to the Earl of Suffolk, and afterwards planted out the young trees where they now stand. These trees are, therefore, at this time, sixty-two years old, from the seed.

plump and good*. Observe not to put them into the oven when too hot, as it will make them shrivel: And those for sowing must not be dried in this manner, as the heat of the oven would kill the germ. In a fine warm season, I have seen them ripen as well and grow nearly to as large a size as foreign ones, when the trees were healthy; but in a middling season they will do very well for sowing, or for fatting pigs and poultry. Be careful to preserve them from rats and mice, otherwise they will soon destroy vast quantities of them.

They may be sown in beds of light earth in the month of November, if it be a dry autumn, drawing the drills about nine inches apart, and about three deep. Plant the nuts about an inch apart in the rows, with the points upwards, as bulbous roots are planted; then cover them with mould, and pat it down with the back of your rake. The beds should be four or five feet wide, and a little raised towards the middle to carry off the water. There should be alleys between the beds, about eighteen inches wide, and about two or three inches deep; these will receive and carry off the rain-water, which otherwise would be apt to rot the nuts. Thus, a five-foot bed will admit of six rows and a small edging next the alley. If you find the mice begin to attack them, the beds should be completely covered over with slates, flat stones, or bricks, till the nuts begin to spring; they must then be taken off. If it be a hard winter, it will be necessary, before the stones or tiles are put on, to cover the beds with some rotten dung, rotten leaves, or old tan, to preserve the nuts from the frost. If it be a mild winter, and the nuts have been sown in autumn, they will begin to vegetate before Christmas; but if the autumn be wet, I would advise not to sow them till some time in February, or the beginning of March. By the nuts being sown in rows, you will have room to hoe betwixt the rows, and be able to keep them clear of weeds, which you could not so easily do if they were sown broadcast. If it should prove a very dry summer, it will be necessary to give them a good watering once or twice a week, till the plants begin to get strength. If they be well managed, by the end of October, or in the following spring, you may transplant them into beds, in rows about a foot apart, and at the distance of four inches in the row, where they may remain for two years longer;

* In America, particularly, chesnuts become very much shrivelled in about two months after they are gathered. The method here described, will effectually prevent this. Chesnuts may, by this method, be kept good, fresh, and full-skinned, all the year round, and this, too, without any expence, worth speaking of, and with very little trouble. The same observations apply to all sorts of nuts.

taking care to trim all the side shoots, leaving only one straight stem. These beds may have alleys about the same width as before, with this difference, that the beds should be two inches lower than the alleys, which must be well trodden, to keep the earth from crumbling down into the beds. First level all your ground, then stretch the line from one end of the bed to the other, according to the size of the ground, and with your spade cut off the edging in the inside of the bed, throwing the mould towards the middle of it; then remove the line to the other side of the bed, which ought to be from four to six feet wide, and cut the other edge, throwing the mould into the bed as before. When this is done, throw up some of the mould on the top of the alley, to make it about two inches higher than the bed, and tread the alley well down. Then begin to plant your young trees in rows across the bed, a foot or fifteen inches apart, and about six inches in the row, digging the ground and planting as you proceed, also beating up the edges of the alleys with the back of your spade, to keep the mould from tumbling down into the bed. Proceed thus till you have finished the bed, and so on till you have planted the whole. If it be dry weather, each bed should be watered as you finish planting it, which being made a little lower then the alleys will retain the water that you throw on it, and will prevent the rain from running off: If the dry weather continue long, mulch the beds as before directed. Observe to keep them free from weeds, watering them as occasion requires, and trimming up the plants with only one stem. In this state they may remain two years, and, if any of the plants require it, stake them to keep them straight. At the end of two years they will be fit for transplanting, and may be planted out for good, if they are properly fenced off from cattle; but if they are to be placed in an open exposure, they ought first to be planted out in a piece of ground, properly prepared for the purpose, at the distance of two feet from row to row, and one foot in the row. If they have been planted in the autumn (which I would always recommend, except in wet ground, or when the season is wet), let them remain till next spring twelvemonth, and then head them down to two eyes above ground, cutting as near as may be to an eye, and sloping to the North, that the shoot which is thrown out may cover the stem in the first seasons which, if the business be rightly performed, it will do, and grow to the length of six or seven feet, according to the vigour of the stem. If they are not headed down in this manner, you will never have straight handsome trees. If the ground be properly fenced off from cattle, those that are planted out for good, at three years old,

must be treated in the same manner after the first or second year. It may, however, be necessary to observe, that young trees must not be headed down immediately after transplanting; they ought to be well rooted before that operation is performed; and it is also worthy of remark, that the larger the stems are when they are headed, the stronger and more luxuriant will the shoots be.

I did not, at first, intend to have said any thing of chesnuts and walnuts; but, as most people are fond of them, and as they are generally served up at table with the dessert, it seemed proper to give some account of their culture, &c.

CHAPTER XXI.

OF WALNUTS.

Different Sorts described.....Their Propagation, Planting, and Trimming....Great Utility of the Timber....Method of keeping Walnuts in Winter.

THE Walnut, Juglands, is a native of Persia; and the time of its introduction here is not known with certainty. It belongs to the twenty-first class of Linnæus's System, Monœcia Polyandria.

Those commonly cultivated in this country are the following varieties of the common walnut, viz. the Double Walnut, the Large Walnut, the French Walnut, the Thin-skinned Walnut, and the Late Walnut. The Hickery Nut from North America, the fruit of which is small but well flavoured, is also raised here, as is the Black Virginia Walnut; but this latter is cultivated chiefly for its timber. There are several other sorts from North America, which are planted for variety*.

The best way of raising these trees is from the nut, which should be gathered when full ripe: Those with thin shells are to be preferred for this purpose. Walnuts, unless a sharp frost sets in, which is very seldom the case before they are ripe, should be suffered to remain on the trees till they begin to drop of themselves: Shaking of the tree will then bring them down. Beating them down with poles, as is usually done, injures the trees very much, by breaking the young shoots: Beside, the nuts never will keep well when they are thrashed down too early.

The nuts may be sown in drills in the same manner as chesnuts: The best time for doing this, if the season be dry, is autumn; and the nuts must be thoroughly dry, otherwise they will be apt to rot before they vegetate. If the autumn be wet, they may be sown in the month of February or the beginning of

* These latter are the different sorts of what is called the Butter Nut, in America. They seldom bear, in England, and the fruit is good for nothing.

March, and ought to be covered over as directed for chesnuts, to preserve them from mice. If they thrive well, they will be fit for transplanting the first autumn after sowing; but, if not, they should be suffered to remain another year. Bed them out in the same manner as directed for chesnuts, transplanting every second or third year, until they are planted out for good. This will cause them to throw out fine horizontal roots, and bring them into a bearing state much sooner than when they make deep tap-roots. Train them up with fine single stems to about seven feet high, before you suffer them to form heads; the branches will then be out of the reach of cattle. The time of transplanting them out depends on the progress that they have made in the nursery; they should be suffered to continue there until they have grown to a tolerable size, and to the height just mentioned as proper for standards. The ground, where they are to be planted, should be well ploughed or trenched, and the tree planted, at first, in rows six feet apart, and the same distance from tree to tree in the rows, in the quincunx order, and thus to remain till they come into bearing. This will be necessary, as there is no dependance on the sort of fruit that trees raised from seed may produce. After you have made choice of those which bears the best fruit, the other may be planted out for timber, or cut down for stakes, or any other purpose. The trees left for bearing must be thinned, by taking out every other tree in the remaining rows, as they increase in size, till they stand at the distance proper for full grown trees; which may be from twenty-four to forty-eight feet according to the richness of the soil and the progress which the trees make.

In trimming the stems of walnut-trees, cut off the shoots and small branches close to the bole; and in lopping, cutting, out cross branches, or such as are damaged by winds and other accidents, always cut at a fork or eye, otherwise part of the branch will die and injure the tree. But, whether only a part or the whole of a branch be cut off, the composition ought immediately to be applied*.

Formerly, walnut-tree was much used for building, and for houshold furniture; but mahogany and other foreign timbers, have now in a great measure superceded it, especially in the latter article. This timber will do very well for uprights, but is rather too brittle for joists, rafters, &c. and, when pro-

* I know that there is great difficulty in raising walnut-trees in America; but, I nevertheless, am of opinion, that, if proper attention were paid to the cultivation of them, they would answer very well. At any rate it is worth a trial.

perly polished, it looks very well in chairs, tables, bureaus, &c. It is, at present, a good deal used for gun-stocks. Walnuts thrive best in a deep rich soil, but will do very well in a chalky soil, as may be seen on the hills in Surry, in the neighbourhood of Leatherhead, Godstone, and Carshalton; and, at Beddington-Park, the seat of the antient family of the Carews, there are many fine old walnut-trees. These trees are well worth cultivating; as the yearly value of the fruit that they bear is very considerable*. There is a great deal of money made, in plentiful years, by thinning of the nuts for pickling, both for home consumption, and also for exportation. The leaves of walnuts steeped in boiling water, and that infusion mixed with lime-water, soap-suds, and urine, is found very efficacious for destroying slugs and worms in the ground, and insects on trees.

Walnuts for keeping should be suffered to drop of themselves, and afterwards laid in an open airy place till they are thoroughly dried; then pack them in jars, boxes, or casks, with fine clean sand, that has been well dried in the sun, in an oven, or before the fire, in layers of sand and walnuts alternately; set them in a dry place, but not where it is too hot. In this manner I have kept them good till the latter end of April. Before you send them to table, wipe the sand clean off; and, if you find that they have become shrivelled, steep them in milk and water for six or eight hours before they are used; this will make them plump and fine, and cause them to peel easily.

* At Beddington, about 50 walnut-trees (and not above half of that number full bearers) have been let at 30l. 40l. and 50l. according to the crop; and it is supposed, that in a good season the renter clears 50l. by the bargain.

Beddington was noated in Queen Elizabeth's time for the finest orangery in England.

CHAPTER XXII.

OF GRAFTING AND BUDDING.

Four different ways of Grafting, with Observations....On using the Composition, instead of Grafting-Clay.....Of Budding, with Observations, &c.

GRAFTING is the taking of a shoot from one tree, and inserting it into another, in such a manner as that both may unite closely and become one tree; this is called, by the antient writers in husbandry and gardening, *incision*, to distinguish it from inoculating, or budding, which they call *inserere oculos*.

I have taken a great deal of pains to trace the practice of grafting to its origin; but without success, as no author that I have perused gives any satisfactory account of it; it is however, allowed by all to be very antient.

The use of grafting is, to propagate any curious sorts of fruits so as to be certain of the kinds; which cannot be done by any other method: For, as all the good fruits have been accidently obtained from seeds, so, of the seeds of these, when sown, many will degenerate, and produce such fruit as is not worth the cultivating: But when shoots are taken from such trees as produce good fruit, these will never alter from their kind, whatever be the stock or tree on which they are grafted.

The principle or philosophy of grafting is somewhat obscure; and, had not accident given the first hint, all our knowledge of nature would never have led us to it. The effect is ordinarily attributed to the diversity of the pores or ducts of the graft from those of the stock, which change the figure of the particles of the juices in passing through them to the rest of the tree.

Mr. Bradley, on occasion of some observations by Agricola, suggests something new on this head. The stock grafted on he thinks, is only to be considered as a fund of vegetable matter which is to be filtered through the cion; and digested, and brought to maturity, as the time of growth in the vessels of the cion directs. A cion, therefore, of one kind grafted on

a tree of another, may be rather said to take root in the tree that it is grafted in, than to unite itself with it: For it is visible, that the cion preserves its natural purity and intent, though it be fed and nourished by a mere crab; which is without doubt, occasioned by the difference of the vessels in the cion from those of the stock; so that grafting may be justly compared to planting.

In prosecution of this view, of that ingenious author, we add, that the natural juices of the earth, by the secretion and comminution in passing through the roots, &c. before they arrive at the cion, must doubtless arrive there half elaborated and concocted, and so disposed for a more easy, plentiful, and perfect assimilation and nutrition; whence the cion must necessarily grow and thrive better and faster than if it were put immediately in the ground, there to live on coarser diet and harder of digestion; and the fruit produced by this further preparation in the cion must be finer, and further exalted, than if fed immediately from the more imperfectly prepared and altered juices of the stock. It may, perhaps, be thought unnecessary to say any thing here on grafting, as it has been so fully treated of by Mr. Miller, and other writers on gardening; but as this treatise is principally on pruning and training, grafting seems naturally connected with it.

I persuade myself, therefore, that a few instructions in grafting will not be unacceptable, as they may save the reader the trouble of turning to other books; especially as they are more particularly intended for the grafting of old trees, and such as are found, when they come to bear, to be a different sort from what was expected: For, although nurserymen in general are very careful in these matters, yet, through the inattention of their men, or some mistake, or by an improper choice of the sorts, it will frequently happen, that, after waiting thirteen or fourteen years, when the trees come to bear, the fruit is found of a bad quality, and not fit for use; so that new grafting or budding is absolutely necessary.

I shall, therefore, give what directions may be necessary on that subject, to render it plain and easy to those who have not been regularly instructed in the art of grafting from general practice; and add a method which I have followed for some years, and which I flatter myself will be found an improvement.

The shoots used in grafting are called cions, or grafts; and in the choice of these the following directions should be carefully observed. 1st. That they are shoots of the former year; for when they are older they never succeed well. 2dly.

Always to take them from healthy fruitful trees; for, if the trees from which they are taken be sickly, the grafts very often partake so much of the distemper as rarely to get the better of it, at least for some years; and when they are taken from young luxuriant trees, whose vessels are generally large, they will continue to produce luxuriant shoots, but are seldom so productive as those which are taken from fruitful trees whose shoots are more compact, and the joints closer together; at least it will be a great number of years before the luxuriant grafts begin to produce fruit, even if managed with the greatest skill. 3dly. You should prefer those grafts which are taken from the lateral or horizontal branches, to those from the strong perpendicular shoots, for the reasons before given.

These grafts, or cions, should be cut off from the trees before their buds begin to swell, which is generally three weeks or a month before the season for grafting; therefore, when they are cut off they should be laid in the ground with the cut downwards, burying them half their length, and covering their tops with dry litter, to prevent their drying; if a small joint of the former year's wood be cut off with the cion, it will preserve it the better, and when they are grafted this may be cut off; for at the same time the cions must be cut to a proper length before they are inserted in the stocks; but, till then, the shoots should remain of their full length, as they were taken from the tree, which will better preserve them from shrinking; if these cions are to be carried to a considerable distance, it will be proper to put their ends into a lump of clay, and to wrap them up in moss, which will preserve them fresh for a month, or longer; but these should be cut off from the trees earlier than those which are to be grafted near the place where the trees are growing.

Having given directions for the cions and grafts, we next come to that of the stock, which is a term applied to the trees intended for grafting; these are, either such old trees as are already growing in the places where they are to remain, whose fruit is intended to be changed; or young trees, which have been raised in the nursery for a supply to the garden; in the former case, there is no other choice, than that of the branches, which should be such as are young, healthy, well situated, and have a smooth bark; if these trees are growing against walls, or espaliers, it will be proper to graft six, eight, or ten branches, according to the size of the trees, by which they will be much sooner furnished with branches again, than when a less number of cions are put in;

but in standard trees, four, or at most six, cions will be sufficient.

In the choice of young stocks for grafting, you should always prefer such as have been raised from the seed, and that have been once or twice transplanted.

Next to these, are those stocks which have been raised from cuttings, or layers; but those which are suckers from the roots of other trees should always be rejected; for these are never so well rooted as the others, and constantly put out a great number of suckers from their roots, whereby the borders and walks of the garden will be always pestered during the summer season; these are not only unsightly, but they also take off part of the nourishment from the trees.

If these stocks have been allowed a proper distance in the nursery where they have grown, the wood will be better ripened, and more compact, than those which have grown close, and have been there drawn up to a greater height; the wood of these will be soft, and their vessels large; so that the cions grafted into them will shoot very strong; but they will be less disposed to produce fruit than the other; and when trees acquire an ill habit at first it will be very difficult to reclaim them afterward.

Having directed the choice of cions and stocks, we come next to the operation; in order to which you must be provided with the following tools:

1. A neat small hand-saw, for cutting off the heads of large stocks.

2. A good strong knife, with a thick back, to make clefts in the stocks.

3. A sharp pen-knife, or budding-knife, to cut the grafts.

4. A grafting chisel and a small mallet.

5. Bass strings, or woollen yarn, to tie the grafts with; and such other instruments and materials as you should find necessary, according to the sort of grafting which you are to perform.

6. A quantity of clay, which should be prepared a month before it is used, and kept turned and mixed, like mortar, every other day: This is to be made in the following manner.

Get a quantity of strong fat loam (in proportion to the quantities of trees intended to be grafted); then take some new stone-horse dung, and break it in among the loam; and if you cut a little straw, or hay, very small, and mix amongst it, the loam will hold together the better; and if there be a quantity of salt added, it will prevent the clay from dividing in dry

weather; these must be well stirred together, putting water to them after the manner of making mortar; it should be hollowed like a dish, filled with water, and kept every other day stirred; but it ought to be remembered, that it should not be exposed to the frost, or drying winds; and the oftener it is stirred and wrought the better.

Of late years, some persons have made use of another composition for grafting, which they have found to answer the intention of keeping out the air better than the clay before described. This is composed of turpentine, bees-wax, and rosin, melted together; which, when of a proper consistence, may be put on the stock round the graft, in the same manner as the clay is usually applied; and, though it be not above a quarter of an inch thick, it will keep out the air more effectually than the clay; and, as cold will harden this, there is no danger of its being hurt by frost, which is very apt to cause the clay to cleave, and sometimes to fall off; and, when the heat of the summer comes on, this mixture will melt, and fall off without any trouble. In the using of this, there should be a tin or copper pot, with conveniency under it to keep a very gentle fire with small coal; otherwise the cold will soon condense the mixture: But you must be careful not to apply it too hot, lest you injure the graft. A person who is a little accustomed to this composition will apply it very fast; and it is much easier for him to work with than clay, especially if the season should prove cold.

There are several ways of grafting, but four principal ones. [*See Plate* 11.]

1. Grafting in the rind, called also shoulder-grafting; which is only proper for large trees: This is called crown-grafting, because the grafts are set in form of a circle, or crown; and it is generally performed about the latter end of March, or the beginning of April.

2. Cleft-grafting, which is also called stock, or slit-grafting; this is proper for trees or stocks of a lesser size, from an inch to two inches or more, diameter: This grafting is to be performed in the months of February and March, and supplies the failure of the escutcheon way, which is practised in June, July, and August.

3. Whip-grafting, which is also called tongue-grafting: This is proper for small stocks of an inch, half an inch, or less, diameter; it is the most effectual way of any, and is most in use.

4. Grafting by approach, or ablactation: This is practised when the stock that you would graft on, and the tree from

which you take your graft, stand so near together, that they may be joined; and should be performed in the month of April. This method, which is also called inarching, is chiefly used for jasmines, oranges, and other tender exotic trees.

We come next to the manner of performing the several methods of grafting.

The first, which is termed rind, or shoulder-grafting, is seldom practised but on large trees, where either the head or the large branches are cut off horizontally, aud two or more cions put in, according to the size of the branch, or stem; in doing this, the cions are cut flat on one side, with a shoulder to rest upon the crown of the stock; then the rind of the stock must be raised up, to admit the cion between the wood and the bark of the stock, which must be inserted about two inches, so as that the shoulder of the cion may meet, and closely join the crown of the stock; and, after the number of cions is inserted, the whole crown of the stock should be well clayed over, leaving two eyes of the cions uncovered therewith, which will be sufficient for shooting. This method of grafting was much more in practice formerly than it is at present; and the discontinuance of it was caused by the ill success with which it was attended; for, as these cions were placed between the rind of the stock and the wood, they were frequently blown out by strong winds, after they had made large shoots, which has sometimes happened after five or six years' growth; so that, whenever this method is practised, there should be some stakes fastened to support the cions until they have almost covered the stock.

The next method is termed cleft, or stock-grafting; this is practised upon stocks, or trees, of a smaller size, and may be used with success where the rind of the stock is not too thick, whereby the inner bark of the cion will be prevented from joining to that of the stock. This may be performed on stocks, or branches, that are more than one inch diameter: The head of the stock, or branch must be cut off with a slope, and a slit made the contrary way, in the top of the slope, deep enough to receive the cion, which should be cut sloping like a wedge, so as to fit the slit made in the stock; being careful to leave that side of the wedge which is to be placed outward much thicker than the other: And in putting the cion into the slit of the stock, there must be great care taken to join the rind of the cion to that of the stock; for if these do not unite, the grafts will not succeed; when this method of grafting is used to stocks that are not strong, it will be proper to make a ligature of bass, to prevent the slit of the stock from

opening; then the whole should be clayed over, to prevent the air from penetrating the slit, so as to destroy the grafts, only leaving two eyes of the cions above the clay for shooting.

The third method is termed whip, or tongue-grafting, which is the most commonly practised of any by the Nurserymen near London, especially for small stocks, because the cions much sooner cover the stocks in this method than in any other.

This is performed by cutting off the head of the stocks sloping; then there must be a notch made in the slope toward the upper part downward, a little more than half an inch deep, to receive the cion, which must be cut with a slope upward, and a slit made in this slope like a tongue, which tongue must be inserted into the slit made in the slope of the stock, and the cion must be placed on one side of the stock, so as that the two rinds of both cion and stock may be equal and join together exactly; then there should be a ligature of bass to fasten the cion, so that it may not be easily displaced, and afterwards clay it over as in the former methods.

The fourth sort of grafting is termed, inarching, grafting by approach, or ablactation. This is only to be performed when the stocks that are designed to be grafted, and the tree from which the graft is to be taken, stand so near together, as that their branches may be united. It is commonly practised on tender exotic plants, and some other sorts which do not succeed in any of the other methods.

In performing this operation, a part of the stock or branch must be slit off about two inches in length, observing always to make choice of a smooth part of the stock; then a small notch should be made in this slit of the stock downward, in the same manner as hath been directed for whip-grafting; the branch of the tree designed to be inarched should have a part slit off in like manner as the stock, and a slit made upward in this so as to leave a tongue, which tongue should be inserted into the slit of the stock; observing to join their rinds equally, that they may unite well together; then make a ligature of bass, to keep them exactly in their situation, and afterwards clay this part of the stock over well, to keep out the air; in this method of grafting, the cion is not separated from the tree until it is firmly united with the stock, nor is the head of the stock, or branch, which is grafted, cut off till this time, and only half the wood pared off with a slope, about three inches in length, and the same of the cion or graft.

This method of grafting is not performed so early in the season as the others; it being done in the month of April,

when the sap is flowing, at which time the cion and stock will join together, and unite much sooner than at any other season.

The walnut, fig, and mulberry, will take by this method of grafting, but neither of these will succeed in any of the other methods; there are also several sorts of evergreens that may be propagated by this method of grafting; but all the trees that are grafted in this way are weaker, and never grow to the size of those which are grafted in the other methods; therefore this is rarely practised but on such sorts of trees as will not take by the other methods.

Observations on Grafting.

In a long continuance of dry weather the grafts very frequently fail of taking; sometimes, no doubt, owing to the improper choice of the grafts, as well as to the dry weather. Great care should always be taken not to graft with weak shoots, particularly those taken from near the top. Always take your grafts from the lower end of the shoots, and observe that the wood is plump and fresh; for such as are shrivelled seldom or never take. Where any have missed in the spring, I would advise to cut off, about the middle or latter end of June, (in America, the middle of July) some fine healthy grafts of the sort that you wish to graft with, open the bark in the same manner as you do for budding [of which hereafter], and insert the graft with a piece of the former year's wood on it: After you have done this, rub in, with a brush, some of the composition in a liquid state; then wrap your bass round it, as is done for spring grafting, leaving about three eyes on the shoot, which should be tied on with the bass as tight as you can; then cover the outside of the bass, thus tied up, with the composition to the thickness of about one eighth of an inch, observing also to cover the end of the shoot with the same, to exclude the air and wet. In about three weeks, or a month, look over the grafts to see if they have taken. When the graft begins to swell, it will throw off the composition: When that is the case, always remember to apply more, to prevent the air from penetrating the incision.

In the month of September, you should examine whether the wounds are all healed up, and the two barks perfectly united; if they are, you may slacken the bass; and if they are perfectly healed up, it may be taken off; but if not, the bass must again be tied on, and covered with the composition as before directed; letting it remain till the following spring. You may then take the bass off; and, if you find that the two barks have separated

during the winter, with the point of a sharp knife, cut out all the brown part of the bark (which, if left, would infallibly bring on the canker), and rub the composition into the wound. If your grafts have produced strong leading shoots, the tops of them should be pinched off with the finger and thumb; but if they have not shot strong, they should not be cut till the spring, when they should be cut to three or four eyes, according to their strength, to make them produce horizontal shoots, and form handsome heads. This grafting should always be performed in moist or cloudy weather.

I have already, in the chapter on apple-trees, mentioned the advantages to be derived from using the composition instead of grafting-clay, and also given some directions for the same. Rubbing a little of it into the incision will effectually prevent the canker, and in applying it round the graft a much less quantity will be sufficient than of the clay; as it need not be more than three inches round in grafting small stems or shoots, and so in proportion for those which are larger. The composition will keep the cion moist, and will not crack and fall off in dry weather as clay does. The composition to be used in grafting should be of such a consistence as to work easily with the hand, or a knife, or small trowel, rather softer than grafting-clay generally is. Any person, who gives this method a fair trial, will find it to be a sure, neat, and expeditious way of grafting.

Grafting, or budding, should be performed as near to the upper side of a bud as possible. The most proper place for inserting the cion, or bud, is at the joint a little above the cross shoot.

Inoculation, or Budding.

This is commonly practised upon all sorts of stone fruit in particular; such as peaches, nectarines, cherries, plums, &c. as also oranges and jasmines; and is preferable to any sort of grafting for most kinds of fruit. The method of performing it is as follows: You must be provided with a sharp penknife, or what is commonly called a budding-knife, having a flat haft (the use of which is, to raise the bark of the stock to admit the bud), and some sound bass mat, which should be soaked in water to increase its strength, and make it more pliable; then, having taken off cuttings from the trees that you would propagate, you should choose a smooth part of the stock, about five or six inches above the surface of the ground, if designed for dwarfs, and for half standards at three feet; but, for standards, they should be budded six or more feet above the

ground; then with your knife, make an horizontal cut across the rind of the stock, and from the middle of that cut make a slit downwards about two inches in length; so that it may be in the form of a T; but you must be careful not to cut too deep, lest you wound the stock; then having cut off the leaf from the bud, leaving the foot-stalk remaining, you should make a cross cut about half an inch below the eye, and with your knife slit off the bud with part of the wood to it, in form of an escutcheon; this done, you must with your knife pull off that part of the wood which was taken with the bud, observing whether the eye of the bud be left to it or not (for all those buds which loose their eyes in stripping should be thrown away, being good for nothing); then having gently raised the bark of the stock where the cross incision was made, with the flat haft or handle of your knife clear of the wood, you should thrust the bud therein, observing to place it smooth between the rind and the wood of the stock, cutting off any part of the rind belonging to the bud which may be too long for the slit made in the stock; and having thus exactly fitted the bud to the stock, you must tie them closely round with bass mat, beginning at the under part of the slit, and so proceed to the top; taking care that you do not bind round the eye of the bud, which should be left open.

When your buds have been inoculated three weeks or a month, you will see which of them have taken; those which appear shrivelled and black are dead; but those which remain fresh and plump, you may be sure are joined; and at this time you should loosen the bandage, which if not done in time, will pinch the stock, and greatly injure, if not destroy the bud.

In the March following you must cut off the stock about three inches above the bud; sloping it, that the wet may pass off, and not enter the stock: To this part of the stock left above the bud, it is very proper to fasten the shoot which proceeds from the bud, and which would be in danger of being blown out, if not prevented; but this must continue no longer than one year, after which it must be cut off close above the bud, that the stock may be covered thereby.

The time for inoculating is, from the middle of June until the middle of August, (in America, from the end of June to the end of August,) according to the forwardness of the season, and the particular sorts of trees to be propagated; but the time may be easily known, by trying the buds, whether they will come off well from the wood, or not. However, the most general rule is, when you observe the buds formed

at the extremity of the same year's shoots, which is a sign of their having finished their spring growth.

The first sort commonly inoculated is the apricot, and the last the orange-tree, which should never be done until the middle of August; and in doing of this work, you should always make choice of cloudy weather; for if it be done in the middle of the day, in very hot weather, the shoots will perspire so fast as to leave the buds destitute of moisture; nor should you take off the cuttings from the trees long before they are used; but if you are obliged to fetch your cuttings from some distance, as it often happens, cut off the leaves, but let all the foot-stalks remain, then wrap the cuttings up in wet moss and put them in a tin box (carrying them in a tin case with water being now disused) to exclude the air; in this manner you may carry them to any reasonable distance in good condition for inoculating.

It is a very improper practice of many persons, to throw their cuttings into water; for this so saturates the buds with moisture, that they have no attractive force left to imbibe the sap of the stock; for want of which they very often miscarry.

But before I quit this subject, I beg leave to observe, that though it is the ordinary practice to divest the bud of that part of the wood which was taken from the shoot with it; yet, in many sorts of tender trees, it is best to preserve a little wood to the bud, without which they often fail. The not observing this has occasioned some people to imagine, that certain sorts of trees are not to be propagated by inoculation; whereas, if they had performed it in this method, they might have succeeded, as I have several times experienced.

The next thing necessary to be known by those who would practise this art is, what trees will take and thrive, by being grafted, or inoculated, upon each other; and here there have been no sure directions given by any of the writers on this subject; for there will be found great mistakes in all their books, in relation to the matter; but, as it would extend this article too far, if all the sorts of trees were to be here enumerated which will take upon each other by grafting or budding, I shall only give such general directions as, if attended to, will be sufficient so to instruct persons, as that they may succeed.

All such trees as are of the same genus, *i. e.* which agree in their flower and fruit, will take upon each other: For instance, all the nut-bearing trees may be safely grafted on each other, as may all the plum-bearing trees, under which head I reckon not only the several sorts of plums, but also the al-

mond, peach, nectarine, apricot, &c. which agree exactly in their general characters, by which they are distinguished from all other trees; but, as many of these are very subject to emit large quantities of gum from the parts of the trees which are deeply cut and wounded; in the tender trees of this kind, viz. peaches and nectarines, which are most subject to this, it is found to be the surest method to bud or inoculate these sorts of fruits*.

All such trees as bear cones will do well upon each other, though they may differ in one being ever green, and the other shedding its leaves in winter; as is observable in the Cedar of Libanus, and the Larch-Tree, which are found to succeed upon each other very well; but these must be grafted by approach; for they abound with a great quantity of resin which is apt to evaporate from the graft if separated from the tree before it is joined with the stock, whereby they are often destroyed; as also the laurel on the cherry, or the cherry on the laurel. All the mast-bearing trees will also take upon each other, and those which have a tender soft wood will do well if grafted in the common way; but those that are of a more firm contexture, and are slow growers, should be grafted by approach.

By strictly observing this rule, we shall seldom miscarry, provided the operation be rightly performed, and at a proper season, unless the weather should prove very bad, as it sometimes happens, whereby whole quarters of fruit-trees miscarry; and it is by this method that many kinds of exotic trees are not only propagated, but also rendered hardy enough to endure the cold of our climate in the open air; for, being grafted upon stocks of the same sorts which are hardy, the grafts are rendered more capable of enduring the cold, as hath been experienced by most of our valuable fruits now in England, which were formerly transplanted hither from more Southerly climates, and were at first too impatient of our cold to succeed well abroad; but have been, by budding or grafting upon more hardy trees, rendered capable of resisting our severest cold.

These different graftings seem to have been greatly in use among the antients, though they were certainly mistaken in the several sorts of fruits which they mention as having succeeded

* The peaches and nectarines, in America, should be inoculated upon plums, almonds, or apricots, all of which have a much greater capacity of resisting the attacks of those insects, which destroy the tree. But, I imagine, that, if the American cultivator pay attention to the chapters on diseases and on insects, he will easily preserve, or restore, the stems of all his fruit trees.

upon each other; as the fig upon the mulberry, the plum upon the chesnut, with many others of the like kind; most of which have been tried by Mr. Miller, and found not to succeed; therefore what has been advanced on this head by the antients is not founded on experience; or, at least, they did not mean the same plants which at present are called by those names; though I cannot help thinking that we are apt to pay too much deference to the writings of the antients, in supposing them seldom to be mistaken, or to assert a falsehood; whereas, if their works are carefully examined, it will be found, that they have often copied from each other's writings without making experiments to prove the truth of their assertions; and it is well known, that the ranging of plants before Cæsalpinus's time (which is about two hundred years since) was, by their outward appearance, or from the supposed virtues of them, a method that is now justly exploded; and it has been observed, from many repeated trials, that however plants may resemble each other in the shape and make of their leaves, manner of shooting, &c. unless they agree in their fruit, and their other distinctive characters, they will not grow upon each other, though performed with ever so much art.

Observations on Budding Pear-Trees.

When the pear-trees which are grafted in the spring have not taken, I would advise to cut them off, a little below the graft, at a joint or bud. The tree will then throw out a great number of healthy shoots: Rub these all off, except so many as will be sufficient to fill the wall; nailing those up, to prevent the wind from breaking them.

About the latter end of July the shoots will be fit to bud, which should be done about that time. I would recommend leaving a little of the wood on the inside of the bud when inserted into the stock, rubbing in the composition, and tying on the bass as before.

Last spring I grafted some Summer Bonchrêtiens with the Bergamot de Pasque (or Easter Bergamot), and Pear d'Auch, most of which failed. I then cut them off below the grafts, and in July following they had produced shoots from five to six feet long, which I budded in the latter end of that month with the beforementioned sorts, which all took. About the beginning of September I ordered a man to slacken the basses; which having left too loose, the barks began to separate. I then made him tighten them, letting them remain till the following spring. About the beginning of April, when I saw the buds begin to shoot, I cut the shoots near to the buds, but

finding many where the bark had not united, and some of the eyes apparently dead, I took a sharp pen-knife and cut out all the decayed bark, rubbing in the composition, in the liquid state, till the hollow parts were filled up; I then smoothed it off, with the finger, even with the bark of the stock. I also rubbed some of the composition over those eyes that were in the worst state, being quite black; but with very little hope of recovery. To my great astonishment, many of those which seemed perfectly dead, recovered, and by the middle of July had shoots from five to six feet long (many of the shoots which took well have fruit buds formed for next year), and covered a space of wall larger than a young tree would have done in eight years; all the cavities where I cut out the dead bark, and applied the composition, were, in the course of the summer, filled up with sound wood, and the bark between the stocks and grafts perfectly united.

Three years ago I budded on some Brown Beurrés and Crasanes with Pear d'Auch, one of which now covers a wall sixteen feet high, and fifteen feet long, and has more fruit on it this year than a maiden tree would have produced twenty years after planting.

I never recommend budding or grafting of old trees, except when you have bad sorts, or more of any sort than you want for a supply: In that case, I would recommend to bud or graft with Pear d'Auch, Colmars, and Winter Bonchrêtiens, which keep much longer than Beurrés, Crasanes, &c.

It will be necessary to give some directions for standards that have been grafted in the spring, and have missed. In such case, they should be cut below the graft, as directed for wall-trees; and when so treated, they will throw out a great number of shoots, which should by no means be too soon thinned, as in that case they will be liable to be broken by the wind. You may begin to take off the weakest shoots about the latter end of May, or beginning of June. About the middle of the latter month, they will have acquired considerable strength; you may then thin them; leaving as many strong regular shoots, and of those nearest the top of the stem, as will form a handsome head. If the stem be very strong, it will be necessary, perhaps, to leave more than you intend to bud, on purpose to receive the sap, which will flow in great abundance from a large trunk, and, without this precaution, would be apt to burst the shoots, if there be not a sufficient number to receive it. I have often seen shoots as large as my arm burst by a superabundance of sap. When that is likely to happen, the best thing you can do is, to scarify the shoots, and rub a little of the composition into the wound.

CHAPTER XXIII.

OF A GARDEN.

Its Situation, Size, Soil, and Form....Of Watering, Draining, &c.....Of the Melon-Ground.*

A GARDEN, if possible, should be on a gentle declivity towards the South, a little inclining to the East to receive the benefit of the morning sun. If it be situated in a bottom, the wind will have the less effect upon it; but then damps and fogs will be very prejudicial to the fruit and other crops: And if situated too high, although it will in a great measure be free from damps and fogs, it will be exposed to the fury of the winds, to the great hurt of the trees, by breaking their branches and blowing down the blossoms and fruit. A garden should be well sheltered from the North and East, to prevent the blighting winds from affecting the trees; and also from the Westerly winds, which are very hurtful to gardens in the spring or summer months. If a garden be not naturally sheltered with gentle rising hills, which are the best shelter of any, plantations of forest-trees made at proper distances, so as not to shade it, will be found the best substitute. At the same time, there ought to be a free admittance for the sun and air. On that account, a place surrounded by woods is a very improper situation for a garden or orchard, as a foul stagnant air is very unfavourable to vegetation; and it is also observed, that blights are much more frequent in such situations, than in those that are more open and exposed.

I have recommended the practice of intermixing fruit-trees in shrubberies and plantations of this kind to several gentlemen, who have adopted it with success. While the fruit-trees are in flower, they are a great ornament to the shrubberies; and in summer and autumn the different colours of the fruit have a beautiful appearance. Add to this the advantage

* Some of the directions, contained in this chapter, will not apply to America; but the far greater part of them will, and I recommend those, who wish to have complete gardens, to study it with care.

of a plentiful supply of fruit for the table, and for making cider and perry; and if some cherries are interspersed among them, they will be food for birds, and be the means of preventing them from destroying your finer fruit in the orchard or garden.

About six years ago, my worthy friend Walter Urquhart, Esq. of Warley Park, near Waltham Abbey, planted a clump of fruit and forest-trees, with flowering shrubs in front, next the house, to screen his garden, which was so injudiciously situated as to present the walls to view from the house, and from almost every part of his beautiful park. The fruit-trees made choice of for this purpose were large ones of various kinds, which had been headed down, and were then full of fruit-buds. These trees were planted at a proper distance from the garden, so as not to shade the walls, and the forest-trees interspersed among them, according to the height that they would attain when full grown.

Mr. Urquhart has continued to take up some of the forest-trees from time to time, as the fruit-trees spread their branches and require more room. Thus the clump has become a nursery for forest-trees; a great deal of money is saved which would otherwise have been expended in the purchase and carriage of plants; and from it he has made some very fine new plantations. The fruit-trees make a handsome orchard, and at the same time cover the walls of the garden.

When the situation will not admit of such plantations, I would advise planting some cross rows of fruit-trees in the garden, at the distance of forty or seventy yards from each other, more or less according to the size of the garden. In long rows, one row of trees will be sufficient on each side of the walk; but in the shorter cross rows, there should be two rows on each side. The trees should not be planted opposite to each other, but alternately; so as that those of one row may be opposite to the open spaces of the other. Trees planted in this manner will have a good effect, and will also serve to break the force of high winds, and prevent a great deal of damage which might otherwise be done to the rest of the trees throughout the garden. Those which I would recommend for the above purpose are dwarfs, with stems about two feet high, which can easily be obtained by cutting off the lower branches.

In laying out a new garden, another very essential point is, to make choice of a good soil. It should be two or three feet deep; but if deeper the better; of a mellow pliable nature, and of a moderately dry quality; and if the ground should have an uneven surface, I would by no means attempt

to level it; for by that unevenness, and any little difference there may be in the quality, you will have a greater variety of soil adapted to different crops. The best soil for a garden is, a rich mellow loam; and the worst, a stiff heavy clay. A light sand is also a very unfit soil for a garden.

Sea-coal ashes, or the cleaning of streets and ditches, will be found very proper to mix with a strong soil; and if the ground should be cold, a large quantity of coal-ashes, sea sand, or rotten vegetables, should be laid upon it, in order to meliorate and loosen the soil, and render it easy to work.

Lime rubbish, or light sandy earth from fields and commons, will also be found of great service to stiff clayey ground.

If the soil be light and warm, rotten neat's dung is the best dressing that you can give it. If horse-dung be ever used, it must be completely rotted, otherwise it will burn up the crop the first hot weather.

With regard to the form of a garden, there are various opinions, and it sometimes depends on the situation; but where you are at perfect liberty I would prefer a square or oblong. As to the size, it may be from one acre to six or eight within the wall, according to the demand for vegetables in the family. It should be walled round with a brick wall from ten to twelve feet high: But, if there be plenty of walling, which there may be when you are not stinted with respect to ground, I would prefer walls ten feet high, to those that are higher, and I am convinced they will be found more convenient. The garden should be surrounded with a border, or slip, from forty to sixty feet wide or more, if the ground can be spared; and this again inclosed with an oak paling from six to eight feet high, with a cheval-de-frise* at top, to prevent people's getting over: It will also strengthen the paling.

By making slips on the outside of the garden wall, you will have plenty of ground for gooseberries, currants, strawberries, &c. You may allot that part of the slips which lies

* A very good cheval-de-frise may be constructed as follows: Take a piece of wood of a convenient length, about four inches broad, and one inch and a quarter thick, and plane the upper edge into the shape of the roof of a house of a low pitch; then draw a line on each side from end to end, about an inch and a quarter below the upper edge, and through these lines drive twelve-penny nails about four inches distant from each other, so as to come out near the upper edge on the opposite side. Each nail should be opposite the middle of the space between two nails on the other side. The nail heads should be sunk in the wood, and small strips nailed over them; then drive in tenter-hooks between the nail points, and nail the whole firmly on the outside of the top of the paling. In this manner proceed till you have finished the whole of the fence.

nearest to the stables (if well sheltered, and exposed to the sun,) for melon and cucumber beds; and you can plant both sides of the garden-wall, which will give a great addition to the quantity of wall fruit.

If the soil of the new garden be strong, it should be plowed or dug three or four times before you plant any thing in it; and if it be thrown up in ridges during the winter, it will be of great service, as the frost will meliorate and loosen its parts.

Gardens, if possible, should lie near a river, or brook, that they may be well supplied with water. From these, if the garden does not lie too high, the water may be conducted to it by drains, or, which is much better, by pipes, taking care to lay them low enough to receive the water in the driest season, which is the time when it will be most wanted.

If there be no running water near the garden, and if the latter lies on a declivity near a public road, I would advise to make a hollow drain, or a cut, from the most convenient part of the road to receive the water that washes the road in rainy weather, and convey it to a large cistern, or tank, in the upper part of the garden; this, if the road be mended with lime-stone or chalk, will prove an excellent manure. The water from the cistern, or from the river, may be conducted to the different quarters by means of pipes, which having cocks at proper places, the water may be turned upon the different quarters of the garden at pleasure. Or the water may be conveyed in proper channels, and turned on the quarters in the same manner as in watering meadows.

These pipes, channels, &c. will be a considerable expence at first; but they will soon repay it by saving a great deal of time, which would otherwise be spent in pumping and carrying water. The most convenient time for turning the water on, is in general, during the night; and in dry weather it would then be of the most essential service.

If the situation be such that you are obliged to pump the water from deep wells, there should be a large reservoir, in which it should be exposed to the sun and air for some days before it is used: It may then be turned on as above.

If the ground be wet and spewy, it will be proper to make a bason in the most convenient place, to receive the water that comes from the drains, and to collect the rain that falls on the walks.

In laying out the quarters, you must be guided in a great measure by the form and size of the garden; but do not lay them out too small, as in that case a great part of the ground will be taken up with walks. The best figure is a square or oblong, when the garden is of that form; but if not, they may be laid out in any other figure that is thought to be most convenient.

The middle walks should be about seven feet, which is wide enough to admit a cart; and the others about three or four feet broad; with a border on each side, five or six feet wide, at least, between the walk and the fruit-trees. Walks in kitchen gardens are generally gravelled, and but seldom laid with turf, as the frequent wheeling and treading soon destroys the grass and renders them very unsightly: But a binding sand makes good walks and they are easily kept; for when moss or weeds begin to grow, they may be cleaned with a horse-hoe, or scuffeled over with a Dutch hoe, in dry weather, and raked a day or two after, by which they will be made always to look neat and clean. I, however, give the preference to sea-coal ashes, which in my opinion make the best walks for a kitchen garden, and they are easier kept than any other, being firm and dry, and cleaner to walk on than sand, especially after frost.

The bottoms of the walks should be filled up with brick rubbish, chippings of stones, or gravel and stones; those raked off the quarters will do very well, and by using them you will save carriage.

If the soil be stiff and wet, or subject to detain the moisture, there must be under ground drains made to carry off the water. In this case, let the main drain be made under the walk, to receive and carry off the water from those under the quarters. Draining, when the soil is wet, is absolutely necessary, otherwise the trees will never produce good well-flavoured fruit, and your kitchen plants will be much injured: The drains also under the walks will keep them dry and firm, and make them fit for carting and wheeling on in wet weather.

The borders under the walls, in the inside, should be from ten to twenty feet wide, according to the size of the garden, to give full liberty to the roots of the trees to spread. There should be a foot path about two feet and a half from the wall, for the greater convenience of nailing the trees, gathering the fruit, &c. This walk should be from two to two feet and a half wide (to admit a barrow, or barrow engine for watering the trees), and covered with sand, or, which is better,

coal ashes*, about two or three inches thick; but without any gravel or rubbish below. On these borders you may have early or late crops, according to the aspect; but by no means plant any deep-rooting plants, such as cabbages, beans, peas, &c. (except early frame peas), which would be very hurtful to the trees.

The reasons for allotting part of the outside slip next the stable for hot-beds for raising melons and cucumbers, are, first, because there will be no litter to carry in within the walls to dirty the walks; secondly, the beds will not be seen from the garden; and lastly, the convenience of carrying the dung, by which a great deal of time will be saved in carting and wheeling.

It will be necessary, especially in exposed situations, to enclose the melon ground with either a wall or paling from six to eight feet high. It was formerly a practice to enclose melon-grounds with reed fences; but, although they are tolerably warm, and easily removed from one place to another (being made in separate panels), they are very apt to harbour vermin.

Melons are best worked in brick pits, coped with stone or oak, about twelve feet wide and two and a half deep: The length should be according to the number of frames that you work. The size of the lights, for early melons, should be five feet long, and three broad; but for others they will require to be six feet long, and four broad. The former should be four and the latter three light boxes. For the pits, a nine-inch wall will be sufficient; and if they are intended for a wood coping, the bricklayer must build in some pieces of timber to fasten it to: But where stone can be had at a reasonable rate, I would give it the preference, as wood rots very soon.

There should be a walk between the ridges, about six or seven feet broad, sufficient to admit a cart to carry dung, which will be much more expeditious than wheeling. The walk should be made up as high as the coping, and sloping gently towards each end; the bottom should be filled up and covered as before directed: This will be easily kept clean; so that, after your linings are made up, it may be kept as neat as if it were in a pleasure ground.

It will be necessary to make a loose drain along the middle of the bottom of the pit, to convey away any wet, and

* Slugs avoid coal-ash walks, especially when new-laid and rough; such walks, therefore, may be of service, as they will, in some degree, obstruct the passage of slugs and snails from one quarter to another.

the oozing from the dung, to a cistern, or tank, made on purpose to receive it. This moisture, which is the strength of the dung, may be used for watering cabbage-plants, cauliflowers, &c. or it may be thrown on the ground for manure. I have experienced it to be much better than dung.

When a garden is planted and finished, it will be found very convenient to have a plan of it, with the name of each tree inserted in its proper place. This I had done when the new slips were laid out in Kensington-Gardens about ten or eleven years ago, and have found it of great service.

Walls of kitchen gardens should be from ten to fourteen feet high; the foundation should be two bricks or two bricks and a half thick; the off-set should not be above one course higher than the level of the border; and the wall should then set off a brick and a half thick. If the walls are long, it will be necessary to strengthen them with piers from forty to sixty feet apart; and these piers should not project above half a brick beyond the wall. I do not approve of fixed copings, especially when they project so far as they are generally made to do; I would rather advise to have a moveable wooden coping, fixed on with iron hooks fastened to pieces of wood built into the top of the wall: These copings would also be found very convenient to fasten the nettings, &c. to in spring, for sheltering the fruit-trees. If, however, any should prefer fixed copings, they should not project above an inch on each side of the wall; this small projection will be sufficient to preserve the wall, and will not prevent the dew and rain from falling on the upper parts of the trees, which is of great service to them. Some copings are made of bricks convex on the upper side; but I have lately seen a very good coping at Ashted-Park, near Epsom: It is made of a sort of Welch slate, to be had, of different sizes, at Mr. Samuel Wyatt's slate-yard, Christ-church, near Blackfriar's Bridge. This is made to project about one inch, and answers exceedingly well. Flat copings should have a little slope towards the North or East, according to the aspect of the wall; this will carry the wet from the South and West sides, which otherwise would be apt to injure the early blossoms and fruit on the South and West walls in cold nights.

When bricks can be had, I would advise never to build garden walls of stone; as it is by no means so favourable to the ripening of fruit as brick. When a kitchen garden contains four acres, or upwards, it may be intersected by two or more cross walls, which will greatly augment the quantity of

fruit, and also keep the garden warm and shelter it greatly from high winds*.

* To those American gentlemen, who have land to lay out in pleasure grounds, and most of them have land, which might, at a very little expence, be so disposed of, I would beg leave to recommend the perusal, and, indeed, the study, of the late Lord Orford's celebrated work on "Modern Gardening, and laying out of pleasure grounds, parks, farms, ridings, &c. &c. illustrated by Descriptions." This work is a most excellent guide in the study of the higher order of gardening, and very far surpasses what has been written by Gilpin, and, indeed, by all other authors on the subject.

CHAPTER XXIV.

THE ORCHARD.

Its Size, Situation, and Soil....Choice of Trees, Preparing the Ground, Planting, &c....An Annual Wash for Trees.

ORCHARDS are appropriated to the growth of standard fruit-trees only, where a large supply of fruit is wanted; and generally consist of apple-trees, pear-trees, plum-trees, and cherry-trees; but a complete orchard should have, besides, quinces, medlars, mulberries, service-trees, filberts, Spanish nuts, and barberries; as also walnuts and chesnuts; the two latter of which are well adapted for sheltering the others from high winds, and should therefore be planted in the boundaries of the orchard, a little closer than ordinary, for that purpose. In choosing your trees, too much care cannot be taken to admit of none but such as have good roots, fair clean stems, and proper heads. In selecting your pears and apples, especially the latter, be careful to procure a proper assortment for the supply of your table during the whole year: A very few of the *summer* sorts will suffice; more of the *autumn*, and still more of the *winter* will be required; as upon this last you must chiefly depend for supply from the month of January to July. [*See the Method of Preserving Fruit, chapter 25.*]

In cyder-making counties, such as Hereford, Worcester, Gloucester, Somerset, and Devon, they have large orchards of apples; and in some counties, (Kent in particular) there are orchards wholly of cherries. In general orchards, however, there ought to be a much larger proportion of apples than of any other fruit. Orchards, in proper situations, are very profitable; beside, the trees have a delightful appearance when in blossom, and also when the fruit is ripe.

What has been said respecting the situation and soil of a garden is also applicable to an orchard. The situation of an orchard should be rather elevated than low; on a gentle declivity; and open to the South and South East, to give free admission to the air and rays of the sun (to dry up the damps

and disperse the fogs), which will render the trees healthy, and give a fine flavour to the fruit. An orchard should also be well sheltered from the East, North, and Westerly winds, by plantations, if not naturally sheltered by rising grounds. These plantations of forest-trees should neither be too large nor too near the orchard; as they would in that case prevent a free circulation of the air, which would prove injurious to the fruit-trees. But, if the ground will not admit of such plantations, I would advise planting cross rows of fruit-trees, as directed for gardens. I would also recommend planting some of the largest growing trees nearest the outsides exposed to those winds; two or three rows of which should be planted closer than ordinary, which would greatly shelter those in the interior parts of the orchard. Walnut aud chesnut trees, as has been already observed, are well adapted for this purpose.

As to the size of an orchard, it may be from one to twenty acres, or more, according to the quantity of fruit wanted, or the quantity of ground that you may have fit for the purpose.

That soil which produces good crops of corn, grass, or garden vegetables, will also do for an orchard; but a loamy soil is to be preferred; though any of a good quality, not too light or dry, nor wet, heavy, or stubborn, but of a moderately soft and pliant nature, will be found to answer the end. Shingly and gravelly soils disagree very much with fruit-trees, unless there be loam intermixed*. They will succeed much better on a chalk bottom. On such a soil, I have seen roots twelve feet deep, and trees thrive well. If the bottom be clay, the roots should be cut in once in four years to prevent them from penetrating the clay, which would greatly injure the trees. The soil should be from two to three feet deep; before planting the trees, it should be trenched two spits deep, and ten feet broad where the rows are to be planted, and a spit below loosened, unless it be clay, which should be trodden down. If it be pasture ground, it should be ploughed, and well summer-fallowed, till the grass be killed, otherwise when it is laid in the bottom in trenching, which it generally is, it will be very apt to breed grubs, which will do much mischief.

* Where no better is to be had, the holes should be dug at least three feet deep, and filled up with good mould; if mixed up with rotten dung, rotten leaves, or other manure, the trees will in time amply repay the expence. The dung used for this purpose should be that from the melon and cucumber beds, mixed with the mould from the same, when the beds are broken up in autumn, or winter; it should be laid up in heaps, and continue so for one year at least; but should be frequently turned and have some good fresh mould mixed with it.

Some only dig holes large enough to receive the roots, especially in grass ground which is to be continued so. Others prepare the ground by deep ploughing, if the orchard is to be of great extent. The sward, if pasture, should be ploughed in some time in the spring: Give it a good summer-fallow, ploughing it two or three times, which will rot the turf. A fortnight or three weeks before planting, give the ground a good deep ploughing to prepare it for the reception of the trees. The best time for planting on a dry soil is in October; but, if wet, the latter end of February, or the month of March, will be a fitter season.

In planting, endeavour to suit the trees as well as possible to the soil, and to plant them at proper distances from each other; which may be from forty to eighty feet, according to the size of the trees when full grown. Fruit-trees, as has already been observed, when planted too thick, are very liable to blights, and to be covered with moss, which robs the tree of a great part of its nourishment, besides spoiling the flavour of the fruit. Procure your trees from a soil nearly similar to, or rather worse than that where you intend to plant them; for trees transplanted from a rich soil to a poorer never thrive well, but if from a poor to a richer soil, they will generally succeed.

If trees are planted in the quincunx order, and at the distance of eighty feet, the ground between the rows may be ploughed and sown with wheat, turnips, &c. or planted with potatoes. Ploughing or digging the ground, provided it be not done so deep as to hurt the roots, by admitting the sun and rain to meliorate the ground, will keep the trees in a healthy flourishing state. It will be necessary to support the young trees by tying them to stakes until they are well rooted, to prevent their being loosened or blown down by the wind. The spring after planting, if it prove dry, dig up some turf, and lay it round the stem of the young trees with the grassy side downwards; this will keep the ground moist, and save a deal of watering: If the trees have taken well, this need not be repeated, as they will be out of danger the first year. The turf should be laid as far as you think the roots of the trees extend; and when it is rotted, it should be dug in, which will be of great service to them.

Trees that are of very different sizes when full grown should not be planted promiscuously; but, if the soil be properly adapted, plant the larger in the back part or higher ground, or at the North ends of the rows, if they run nearly North and South, and the others in succession according to their size. Fruit-trees planted in this manner will have a fine effect when

grown up; but if they are planted promiscuously, they will not appear so agreeable to the eye; and, besides, the smaller trees will be shaded by the larger, which will injure them, and spoil the flavour of the fruit.

Orchards should be dunged once in two or three years. The stems of trees in those where cattle feed should be high enough to prevent their eating the lower branches; and fenced in such a manner as to prevent their being barked, or injured, by the cattle rubbing against them, particularly when young; which may be done by triangles of wood, or the trees may be bushed with thorns, &c. The trees are to be pruned and managed as already directed for apples, pears, plums, &c.

If the soil be wet, it must be drained, as already directed for a garden. When the surface of the ground is wet, and has a little descent, it may be formed into a kind of ridges, by making a furrow, from one foot to two feet deep, between every two rows, sloping the ground regularly on each side, from a reasonable distance to the bottom of the furrow. These hollows will carry off the water, and render the surface dry and healthy. If pasture, the turf may be first pared off, and afterwards re-laid when the furrow is made.

In orchards, where cattle are not permitted to go, I would prefer dwarf-trees to standards, taking care to proportion the distance of the rows to the size of the trees. But in orchards kept for pasture it will be necessary to plant standards.

Burning of rotten wood, weeds, potatoe haulm, wet straw, &c. on the windward side of the trees when they are in blossom, will be found a good preservative from blights, caterpillars, &c.

I would recommend washing the trees annually, in the month of February or March, with the following mixture, which will destroy the eggs of insects, and prevent moss from growing on the trunks and branches: It will also help to nourish the tree, keeping the bark fine and healthy; and will have the same effect on it as a top dressing has upon grass land*.

Mix fresh cow-dung with urine and soap-suds, and with this mixture wash over the stems and branches of the trees, as a white-washer would wash the cieling or walls of a room; taking care to cut off all the cankery parts, and to scrape off all the moss, before you lay the mixture on. In the course of the spring or summer, you will see a fine new bark coming on. When the old bark is cankery, you must pare it off with a draw-

* This should never be neglected in America, where the insects are the bane of cultivation.

knife, or such a long knife as I have had made on purpose, especially for wall-trees, where the draw-knife cannot be applied, next the wall. The knives and other tools for dressing decayed trees will be described hereafter†. When you see it necessary to take all the outer bark off, you must cover the stem, &c. with the composition and powder, patting it gently down, as in the case when large limbs are cut off.

If the above wash be repeated in autumn, after the fall of the leaf, it will destroy the eggs of a great many insects that hatch in autumn and winter. This washing will be found of great service to all kinds of fruit and forest-trees whatever.

† See plate 13.

CHAPTER XXV.

OF GATHERING APPLES AND PEARS.

The Time and Manner of Gathering them; and of the Management of the Fruit-Room.....Of Packing Fruit for Carriage.

AS Apples shaken or beaten down with a pole never keep in winter, they ought all to be hand-picked, by a person standing on steps made on purpose.

The steps should be light, for convenience of moving from one place to another; and so contrived, that the ladder may be disengaged from the back at pleasure; which may easily be done if they are fastened together by a bolt at top. There should be a broad step at top to stand on, with room for the basket which is to hold the fruit. When you begin to gather the fruit, you should be provided with hand-baskets of different sizes, and also with large baskets, or hampers, and wheel-barrows. You must lay some short grass mowings, perfectly dry, (which you ought to provide for the purpose in summer, and keep in a shed or any other dry place till wanted) at the bottoms of the large baskets and hampers, to prevent the fruit from being bruised.

Observe attentively when the apples and pears are ripe; and do not pick them always at the same regular time of the year, as is the practice with many. A dry season will forward the ripening of fruit, and a wet one retard it; so that there will sometimes be a month or five weeks difference in the proper time of gathering. The method that I have practised is, to observe when the fruit begins to fall (I do not mean what we call wind-falls, or the falling of such as are infested with the caterpillar, &c. but sound fruit), I then put my hand under it, and if it comes off without any force being used, I take it for granted that the fruit is perfectly ripe, unless the tree be sickly, which is easily known by the leaves or fruit being shriveled. If the foregoing observations are attended to, the fruit will keep well and be plump, and not shriveled, as is the case with all fruit that is gathered before it is ripe.

The person on the steps should pick the fruit carefully, and lay it gently into the basket on the top of the steps; for if it be in the least bruised it will not keep. For the same reason, great care must be taken in emptying the fruit out of the hand-baskets, when full, into the large baskets or hampers. If more than one large basket be wheeled at once, which may generally be done, the lower ones must not be so full as to let the bottom of the upper one touch the fruit. It will also be necessary to put some of the soft dry grass between the baskets, and also over the fruit in the upper basket.

When the fruit begins to fall of itself, cover the ground under the tree with some of the short grass mowings, or if that cannot be procured, with some pease-haulm, or oat or barley-straw, quite dry, this will preserve the fruit from bruising when it drops; the fruit which thus falls of itself should be laid up separate from, and used before that which is hand-picked, according to the season in which they are to be sent to the table. Should any be bruised by falling on one another, they should be thrown aside, as only fit for baking, or to be given to the pigs.

When all the fruit is gathered in, rake off the short grass, &c. and throw it up to rot, or mix it up with dung, or leaves of trees; for if it remain on the ground during the winter it will harbour slugs.

When the bolt of the steps is taken out, and the ladder and back part separated, the ladder will then be fit to use in gathering fruit off wall-trees; only it will be necessary to screw on the upper part of it two pieces of iron, or nail two pieces of ash or oak, about six or eight inches long, to keep it far enough from the wall to prevent the tree from sustaining any damage in the bark or branches; which would infallibly bring on the canker.

When the fruit is carried to the fruit-room, lay some of the dry short grass on the floor in the area of the room; then take the fruit gently out of the baskets, and lay it in heaps on the top of the grass, keeping each sort in a separate heap; the heaps may be from two to three feet high, or according to the quantity of fruit that you have. When the heaps are completed, cover the tops at least two inches thick with short grass, in order to sweat them. Let them lie a fortnight, then open the heaps and turn them over, wiping each apple or pear with a dry woollen cloth, which should be frequently dried during the process, observing now to lay in the middle the fruit which before was at the top. Let the heaps now remain eight or ten days, covered as before; by that time they will have thrown

out the watery crudities which they may have imbibed during a wet season; then uncover the heaps, and wipe the fruit carefully one by one, as before, picking out every one that is injured, or has the least spot, as unfit for keeping.

Fruit should be gathered, if possible, in dry weather, and when the dew is exhaled from off the trees; and remember never to gather in the evening after the dew begins to fall.

During the time that the fruit is sweating, the windows should be left open, except in wet and foggy weather, to admit the air to carry off the moisture which perspires from the fruit. The perspiration will sometimes be so great, that on putting your hand into the heap, it will come out as wet as if it had been dipped into a pail of water: When in this state, it will be necessary to turn and wipe the fruit.

In laying up fruit, the common practice has been to lay it on clean wheat straw; but I find by experience, that when any of the fruit begins to decay, if it be not immediately picked out, the straw, by imbibing the moisture from the decayed fruit, will become tainted, and communicate a disagreeable taste to the sound fruit.

I would likewise caution those who erect new shelves in their fruit-rooms, to have the timber well seasoned, and to make use of white deal in preference to red, as the latter, especially if not very well seasoned, is apt to give a very disagreeable risinous taste to the fruit, which quite spoils its flavour. I would, therefore, recommend covering the bottoms of the shelves with thin coarse canvas (such as may be purchased for about eight or ten pence a yard), on which the fruit should be laid in a single layer, after being wiped perfectly dry; but by no means lay them a-top of one another. When that is done, cover them with a piece of the same canvas, or thin flannel, or with old newspapers, or whitish brown paper, which will in a great measure exclude the air, prevent the frost from injuring the fruit, and preserve a beautiful smoothness on its skin. The fruit should be turned two or three times during the winter; as delicate and tender fruit, by lying long without turning, is apt to rot on the underside, even if perfectly sound when laid up. Be particularly careful, however, to pick out all the damaged fruit.

When the fruit is laid in, put the earliest sorts on the lower shelves, or in the lower drawers, according to the time of coming in, beginning with the Nonesuch, Golden Rennet, and Jenneting Apples, and Bergamot and Beurré Pears (for I find by experience, that the Jargonelle keeps best on the tree, as, if

gathered, it rots almost immediately); thus, by proper management, you may have a constant succession of fruit from one season to the other.

When there are large quantities of fruit, it will require a great deal of time to lay it on the shelves, &c. this business may therefore be done in wet weather, or in the evenings, when you cannot conveniently spare your men from the out door work in the day time.

Those who keep their fruit in store-houses, for the supply of the London and other markets, as well as those who have not proper fruit-rooms, may keep their apples and pears in baskets or hampers; putting some soft paper in the bottoms and round the edges of the baskets, &c. to keep the fruit from being bruised; then put in a layer of fruit, and over that another layer of paper; and so on, a layer of fruit and of paper alternately, till the basket or hamper be full: Cover the top with paper three or four times double, to exclude the air and frost as much as possible. Every different sort of fruit should be packed separately; and it will be proper to fix a label to each basket or hamper, with the name of the fruit that it contains, and the time of its being fit for use.

But the best way of keeping fruit is, to pack it in glazed earthen jars. The pears or apples must be separately wrapped up in soft paper, then put a little well dried bran in the bottom of the jar, and over the bran a layer of fruit; then a little more bran to fill up the interstices between the fruit, and to cover it; and so on, a layer of fruit and of bran alternately, till the jar be full; then shake it gently, which will make the fruit and bran sink a little; fill up the vacancy at top with more bran, and lay some paper over it, covering the top with a piece of bladder to exclude the air; then put on the top or cover of the jar, observing that it fits as closely as possible. These jars should be kept in a room where you can have a fire in wet or damp weather.

Of Packing Fruit for Carriage.

If fruit be to be sent to any considerable distance, great care should be taken in packing it, which should not be in baskets, as they are liable to be bruised among heavy luggage, and the fruit, of course, will be injured. I would, therefore, recommend boxes made of strong deal, of different sizes according to the quantity of fruit to be packed. The following are the dimensions of the boxes in which we send fruit by the coach to Windsor and Weymouth, for the use of his Majesty and the Royal family, viz.

The larger box is two feet long, fourteen inches broad, and the same in depth. The smaller box is one foot nine inches long, one foot broad, and the same deep. These boxes are made of inch deal, and well secured with three iron clamps at each corner; they have two small iron handles, one at each end, by which they are fastened to the roof of the coach: In these boxes we send melons, currants, pears, peaches, nectarines, plums, and grapes, packed so as always to have the heaviest fruit at bottom. The melons are wrapped up in soft paper, the pears, peaches, nectarines, plums, and grapes, are first wrapped up in vine leaves, and then in paper. The cherries and currants are packed in a flat tin box, one foot four inches long, ten inches broad, and four deep.

In packing proceed thus:.....First put a layer of fine long dry moss in the bottom of the tin box, then a layer of currants or cherries, then another layer of moss; and so on, alternately fruit and moss, until the box is so full, that when the lid is hasped down the fruit may be so firmly packed as to preserve them from friction.

Make a layer of fine moss and short soft dry grass, well mixed, in the bottom of the deal box; then pack in the melons with some of the same, packing it tight in between all the rows, and also between the melons, in the same row, till you have finished the layer; choosing the fruit as nearly of a size as possible, filling up every interstice with the moss and grass. When the melons are packed, lay a thin layer of moss and grass over them, upon which place the tin box with the currants, packing it firmly all round with moss to prevent it from shaking; then put a thin layer of moss over the box, and pack the pears firmly (but so as not to bruise them) on that layer, in the same manner as the melons; and so on with the peaches, nectarines, plums, and lastly, the grapes, filling up the box with moss, that the lid may shut down so tight as to prevent any friction among the fruit. The boxes should have locks, and two keys, which may serve for them all; each of the persons who pack and unpack the fruit having a key.

The moss and grass should always be returned in the boxes, which, with a little addition, will serve the whole season, being shaken up and well aired after each journey, and keeping it sweet and clean. After the wooden box is locked, it will be necessary to cord it firmly.

My reason for being so particular on packing of fruit is, that I have known instances of its being totally spoiled in the carriage from improper packing.

By pursuing the above method we have never failed of success; and if fruit be packed according to the foregoing directions, it may be sent to the farthest parts of the kingdom, by coaches or waggons, with perfect safety.

CHAPTER XXVI.

OF THE CANKER AND GUM.

A Description of the Canker; its Origin and Progress.....Full Directions for Curing it....Of the Gum and its Remedy.

THE Canker is a disease incident to trees, which occasions the bark to grow rough and scabby, and turns the wood affected to a rusty brown colour. This disease, if no remedy be applied, will in time totally kill the tree.

Apple-trees are very liable to be infected with the canker from the following causes, viz.

From injudicious pruning, from the foot-stalks of the fruit being left on the trees, and from injuries sustained by applying ladders in gathering the fruit; these injuries are very hurtful to the tree, and will infallibly bring on the canker when no remedy is applied. A man ought to stand on steps, instead of a ladder, when the fruit is out of his reach from the ground. Care should also be taken in nailing, that the shreds be not too tight, which causes a swelling in the shoot, and very often produces the canker.

Another cause of the canker is, when we have very wet autumns, such as that of 1799, which prevents the young wood from ripening, and a hard frost setting in after it kills the young shoots; these, if left on the tree, will bring on the canker, and increase it rapidly. Birds and insects devouring the buds will have the same effect.

Careless people frequently leave the dead shoots on the tree throughout the summer, which will infallibly bring on the canker. Some even leave them for years, until the tree is totally killed. They should be cut off in the end of April, or beginning of May; as by that time you will be able to see how far the disease has advanced. I would advise to cut two or three buds, or even more, below the apparently diseased part, as the canker frequently reaches a great way farther in the heart of the shoot than it appears to do on the outside; you must cut down till the brown colour in the shoot disappears, and nothing remains but sound white wood.

The truth of the foregoing observations will appear evident to any person who takes notice of the apple-trees with their mutilated stag-looking heads, as he rides or walks along the road.

It is a general opinion, that the canker in all trees proceeds from the nature of the ground in which they are planted; such as a sour clay, a shingly or gravely soil, &c.

My late and much esteemed friend Mr. Hudson, author of the 'Flora Anglica', was of this opinion, till I convinced him of the contrary by some experiments made at Nutwell, near Exeter, the seat of the late Sir Francis Drake, a gentleman very fond of gardening and agriculture. Mr. Hudson said, it would be to no purpose to make any attempt to cure the apple-trees, as the ground was of such a nature as to bring on the canker. The trees were, indeed, in a sad condition, being covered all over with lichens and moss, and very much infected with the canker. I requested Mr. Hudson to fix on some of the worst; we then desired the gardener to open the ground round their roots, which we found perfectly sound, the bark of them smooth, and not the least appearance of the canker to be seen.

The canker, as before observed, proceeds from bruises in the bark, from limbs cut off, &c. When these limbs begin to rot and grow hollow, they convey the canker to the root; for it always proceeds from the branches and stem to the roots, and never from the roots to the tree.

It is granted, however, that all fruit-trees love a fine rich mellow loam, and thrive much better in it than in a shingly or gravely soil.

When by accident, or improper treatment, trees receive large wounds, and the cure is left to nature, they are frequently overrun with gum and canker, which, if not checked, will in a short time totally ruin them.

In this case you must carefully pare off, with a draw-knife, or any other convenient instrument, all the diseased part of the bark. The inner white bark is frequently infected; this must also be cut away till no appearance of infection remains. The infection in the inner bark appears like dots made with a pen, all of which must be cut clean out; for, if any part of the canker be left, it will infect the new wood and bark. Wherever you see gum oozing out, you may rest assured that the canker is not quite eradicated; which, if suffered to remain, will spread till the whole tree becomes a mass of gum and canker, and will be killed in a very short time.

When the trunk is become hollow, cut the loose rotten part clean out till you come to the sound wood, taking care to round the edges of the hollow part; then apply the composition in a liquid state, laying it on with a painter's brush wherever the cankered bark has been pared off or the dead wood cut out, till these places are entirely covered with it: When that is done, shake some of the powder of wood-ashes and burnt bones over the composition, and pat it gently down with your hand. [*See the chapter On the Making and laying on of the Composition.*]

If the foregoing directions be carefully followed, the canker will be completely eradicated, and the hollow trunk in time be filled up with sound wood.

When the stem is much decayed, it will be absolutely necessary to open the ground, examine the roots, and cut off all the rotten parts. When you have cut out all the rotten and decayed parts below ground, and scraped the hollow clean, make up a mass of the composition mixed with some clay, like what is used for grafting; then fill the hollow part with it to within about two inches of the surface of the ground, treading it in with your foot, or pressing it in with the hand, as close as you possibly can, to prevent the wet from penetrating to the roots, and leave the surface of the composition sloping from the tree towards the outside of the border, to throw the wet off, which will prevent the fresh part of the root from rotting; then cover the root over with mould level with the rest of the border.

When you have examined all the old wounds where large limbs have been cut off, you should next examine the old bark; and, if you find the outside of it wrinkled and cracked, pare it off, as it is always, when in that state, very much hurt by the canker. This should be done with the draw-knife, or other sharp instrument; then apply the composition as before directed, which will bring on a fine smooth bark under it. In the succeeding winter, or spring, you will see all the plaster, with the old part of the bark that was left in the hollow parts of the tree, or where old branches had been amputated, peeling off and shewing the smooth bark underneath. You should then scrape off, with a wooden or bone knife, what old bark remains in the hollows where the draw-knife could not reach without cutting too much away. When that is done, mix up some fresh cow-dung with soap-suds and urine, making it very thin, and give the tree a coat of this mixture all over where the bark has been scraped off: The cow-dung will adhere to it, and heal the parts where you were obliged to scrape to the in-

ner bark. This wash will remain till the fresh bark comes on; then it will be discharged of itself during the summer, or the next spring, leaving a new fresh smooth bark where the old and cankery was taken off. Next spring, if any of the old bark remains, you may repeat the same operation, which will cause all the remaining old bark to slough off like a scab from a wound on the human body.

By these means you will keep your trees in a fine flourishing healthy state, and, in general, prevent them from becoming bark-bound. If any of them, notwithstanding, should be bark-bound, you must scarify them, by taking a sharp knife, and running the point of it straight down the middle of the stem from top to bottom; taking care to run your knife through the outer bark only; then, with a brush, or your finger, rub in some of the composition, to prevent the incision from bringing on the canker. This operation will cause the tree to expand the bark and become very flourishing.

Remember to cut off all the ends of the small shoots where the canker had injured them last year. Cut off also the old fruit-stalks, and all the small dead stubs, which, if left, will never fail to bring on the canker.

The rough or cankery bark on that side of trees which is next the wall should be scraped or pared off with a tool made in the form of a sickle, which, with other tools, will be described hereafter.

It is much to be regretted, that fruit-trees in general throughout this kingdom are in a mutilated unfruitful state. After gentlemen have purchased the young trees from nurseries, and planted them in their orchards and gardens, they think every thing necessary is done; when, in fact, the greater part of the work is yet to come. In packing and carriage, the stems and branches are very frequently bruised; in that case, the injured parts of the bark and wood must be carefully cut out, and the composition immediately applied: This may be done when you head the trees, which operation should be performed in April, May, or even June, when the bud begins to shoot; but by no means cut off any of the shoots, except those that are broken or bruised very much. When this is neglected, the canker will follow, to the great injury, if not the death of the trees. How common is it to see, in all parts of the country, great numbers of trees so affected with this disease as not to produce fruit enough in twelve or fourteen years to pay half the expence attending them! Whereas, if they were to be managed according to the foregoing directions, they would more than pay all the expence in three years. It is common, when

young trees do not thrive, either to blame the nurserymen for sending bad or diseased trees, or to attribute their unthriving state to the nature of the soil; whereas the fact is, that this frequently arises from the inattention or mismanagement of the person who plants and superintends them. If the injured and diseased parts be not cut out at an early period, the trees will not thrive, but will become cankery and stunted, and cannot be recovered afterwards without a great deal of labour and trouble; whereas, if the directions given for heading trees the first year, and cutting out the diseased parts, be attended to the trees will flourish, and bear large crops of fine and well-flavoured fruit.

The Gum.

The Gum is a kind of gangrene incident to fruit-trees of the stone kind, and arises from the following causes: From injudicious pruning, from bruises, or any injuries received in the wood or bark. This may happen from strokes of the hammer in nailing, from pinching the shoots by nailing the shreds too tight, or by driving the nails too close to the branches. It may also be occasioned by leaving the foot-stalks of the fruit, or by pruning in summer and cutting the shoots to short stumps, and by injuries sustained by a careless application of ladders in nailing and gathering the fruit, &c. but it particularly originates where large limbs have been lopped or broken off. This disease may be known before the gum itself makes its appearance. The bark at first becomes of a brownish colour, which gradually grows darker, till at last the gum begins to ooze out like little blisters. As soon as any of these symptoms are observed, the infected part should be cut out with a sharp instrument, and the composition and powder applied immediately. You must observe to cut out the gum perfectly clean; you will see it oozing out from between the wood and bark: This must be followed till you come to the white clean bark and wood. If afterwards any gum should make its appearance, it must be scraped off; which is best done when it is moistened with rain, as you can then scrape it off easily without hurting the bark. This must be done without delay, otherwise the disease will rapidly advance.

When trees are hollow, it will be necessary to examine them carefully to see whether any grubs have entered the bark and wood, which you will know by their perforating the bark. If there be any, they must be carefully cut out before the composition is applied.

CHAPTER XXVII.

OF THE MILDEW, HONEYDEW, AND BLIGHTS.

A Description of the Mildew, and a Remedy for it...Of the Honeydew and its Remedy....A Description of different sorts of Blights, and the best Means of preventing them.

.....

OF THE MILDEW.

THE mildew, a disease very hurtful to plants, is a kind of thick clammy moisture, which falls on, or rather transpires from the leaves and blossoms of plants. This clammy substance, by stopping up the pores, prevents perspiration, and hinders the growth of the plant. But what is commonly called mildew is an insect which is frequently found in vast numbers feeding upon this moisture. Mr. T. S. Segar, in a treatise upon this subject says, that the mildew is of a very sharp corrosive nature, and by its acrimony hinders the circulation of the nutritious sap; in consequence of which the leaves begin to fade, and the blossoms and fruit are greatly injured.

I have observed that, contrary to the common opinion, trees are more liable to mildew on South and West walls, than on an East wall; and I have frequently removed such trees from a South or West wall, to a North or East wall, where they have perfectly recovered.

Whenever you apprehend danger, wash or sprinkle the trees with urine and lime-water mixed; and when the young and tender shoots are much infected, it will be necessary to wash them well with a woollen cloth dipped in the following mixture, so as to clear them of all the glutinous matter, that their respiration and perspiration may not be obstructed.

Take tobacco one pound, sulphur two pounds, unslaked lime one peck, and about a pound of elder buds; pour on the above ingredients ten gallons of boiling water; cover it close, and let it stand till cold; then add as much cold water as will fill a hogshead. It should stand two or three days to settle, then take off the scum, and it is fit for use.

Of the Honeydew.

The honeydew is a sweet saccharine substance found on the leaves of certain trees, and is generally supposed to fall from Heaven like dew, but this is a mistaken opinion. One kind of honeydew transpires from the leaves of the trees where it is found, and the other is the excrement of a small insect called a vine fretter, a species of aphis. Bees and ants are very fond of both these kinds of honeydew.

As the honeydew by its viscous quality, closes up the pores, and stops the perspiration of trees, it must of course be very hurtful to them. This disease should be treated in the same manner as the mildew; but as has been already observed, trees should be watered, or washed, early enough in the day to get dry before the cold of the night comes on; nor should it be done while the sun shines very hot, which would be likely to scorch the blossoms and leaves.

Of Blights.

Blights are very destructive to fruit-trees, sometimes destroying the whole tree; but more frequently the leaves and blossoms, while the tree itself remains unhurt.

One cause of the blight is, the continuance of a dry Easterly wind for several days together, which stops the perspiration in the tender blossom; and a long continuance of the same weather equally affects the tender leaves, causing them to wither and decay, the perspiring matter is thereby rendered thick and glutinous, and so becomes food for those small insects which are always found in vast numbers on fruit-trees that are affected by this sort of blight.

These insects, however, are not the original cause as some imagine, but the natural consequence of blights; for wherever they meet with such a proper nutriment they multiply amazingly, and greatly promote the distemper when no method is taken to prevent it.

The best remedy for this distemper that I know of is, to wash them with urine and soap-suds, as before directed; and the sooner this is performed, whenever we apprehend danger, the better; if the young and tender shoots seem to be much infected, wash them with a woollen cloth dipped in the same liquid that is recommended for the mildew.

Another cause of blights in the spring will be found in sharp hoary frosts, which are often succeeded by hot sun-shine in the day time; these are certain and sudden destruction to the fruit. Sharp pinching frosty mornings, which often happen when the trees are in flower, or while the fruit is very young,

occasion the blossoms or fruit to drop off, and sometimes greatly injure the tender shoots and leaves.

The only method yet found out to prevent this mischief is, the carefully covering the walls with netting, &c. as before directed*. The covering is to remain on during the night, and to be taken off in the day-time. This method has been reckoned of little service by some, which, indeed, may be the case when the coverings are not properly used; for, if the trees are kept too long covered, the young branches and leaves will be so weak as not to be able to bear the open air when they are exposed to it.

The same consequences will follow when the trees are incautiously exposed to the air after having been long covered.

But if the covering be properly performed, it will frequently preserve the fruits under it, when there happens almost a general failure in the neighbourhood where this precaution has been neglected. The great trouble which seems to attend it may deter many from putting it in practice; yet if the nettings, or other coverings, be so contrived as to draw up and let down by means of pullies, the business may be done with ease and expedition; and the success attending it, will make ample amends.

But what is called a blight, is frequently no more than a weakness or distemper in trees. This is the case when trees against the same wall and enjoying the same advantages in every respect, differ greatly in their health and vigour, the weak ones appearing to be continually blighted, while the others remain in a flourishing condition. This very great difference, in such circumstances, can be attributed only to the different constitutions of the trees, proceeding from a want of proper nourishment, or from some bad qualities in the soil, some distemper in the stock, buds, or cions, or from mismanagement in the pruning, &c. all of which are productive of distempers in trees, of which they are with difficulty cured.

If the fault be in the soil, it must be dug out, and fresh mould put in its place; or the trees must be taken up, and others better adapted to the soil planted in their room. It will be found absolutely necessary always to endeavour to suit the particular sorts of fruits to the nature of the soil; for it is in vain to expect all sorts of fruit to be good in the same soil.

If the weakness of the tree proceed from an inbred distemper it will be advisable to remove it at once, and, after renewing the earth, to plant another in its place.

* Page 9, 10, 37.

But if the weakness has been brought on by ill management in the pruning, which is frequently the case, I would advise the method of pruning and training which is laid down in this treatise to be adopted without loss of time.

How common is it to see the young luxuriant branches trained up to their full length every year, and so carried to the top of the wall in a very short time! By which the fruit-bearing branches are robbed of a great part of their nourishment, which weakens them so much that they have not strength to produce fruit; but the blossoms fall off, and not unfrequently the branches decay, sometimes even the whole length, and this is ascribed to a blast! Luxuriant shoots should be stopped, and all superfluous wood should be cut out: Otherwise they will exhaust a great part of the nourishment which should go to the support of the fruit-bearing branches.

There is another sort of blight that sometimes happens pretty late in the spring, viz. in April and May, which is very destructive to fruit-trees in orchards and open plantations, and against which we know of no effectual remedy. This is what is called a fire-blast, which in a few hours hath not only destroyed the fruit and leaves, but often parts of trees, and sometimes entire trees have been killed by it.

This is generally thought to be occasioned by certain transparent flying vapours, which may sometimes take such forms as to converge the sun's rays in the manner of a burning-glass, so as to schorch the plants they fall upon, and this in a greater or less degree in proportion to their convergency. As this generally happens in close plantations, where the vapours from the earth, and the perspirations from the trees, are pent in for want of a free circulation of air to disperse them, it points out to us the only way yet known of guarding against this enemy to fruits; namely, to make choice of a clear healthy situation for kitchen gardens, orchards, &c. and to plant the trees at such a distance as to give free admission to the air, that it may dispel those vapours before they are formed into such volumes as to occasion these blasts.

But blasts may also be occasioned by the reflection of the sun's rays from hollow clouds, which sometimes act as burning mirrors, and occasion excessive heat. Against this there is no remedy.

CHAPTER XXVIII.

OF INSECTS, &c.

Of the different Sorts of Insects infesting Fruit-Trees, and the Method of Destroying them....How to Preserve Fruit from Birds; and Destroying Rats and Mice.

.....

OF THE APHIS*.

APHIDES, or Plant-Lice, are a very numerous and destructive tribe of insects. Entomologists enumerate 75 species of them; but probably there are many more, as every tree infested by them has a distinct species; and Linnæus names them from the different trees that they live upon; as the Currant Aphis, the Plum Aphis, the Cherry Aphis, &c. The males, which are very few in comparison of the females, have wings; but the females are apterous, or without wings.

Aphides are devoured by the larva of the Myrmeleon Formicarius, or ant-eater, of Linnæus. Ants are likewise very fond of them, on account of a sweet liquor which they eject from the anus. Aphides are extremely common.

Fruit-trees are frequently very much infested with different species of the aphis; the plum, in particular, suffers greatly by them. Those which I have most frequently found on plums are, the brown, the green, and the light sea-green aphis; but, as before observed, different sorts of trees generally have different species of aphides. Great care should be taken to destroy these pernicious insects at as early a period of their growth as possible; otherwise they will consume the leaves and fruit for that season. The best method that I have found for this purpose is, to take some fine wood-ashes mixed with one-third part of fine unslaked lime, and throw it on with a common dredging-box, till you have covered the undersides of all the leaves where you find the insects: This should be

* Those who wish for farther information respecting insects, may consult Reaumur's History of Insects.

done in the morning early while the dew is on the leaves, which will cause the powder to adhere to them; letting them remain so covered with the powdered lime for three or four days. Then mix unslaked lime and soft water, or water that has been exposed to the sun a week at least, at the rate of half a peck to thirty-two gallons, and stir it well two or three times a day for three or four days. If you have many trees that are infected with insects, mix up a large quantity in the same proportion as the above. I generally mix as much at once as will fill a cistern* about seven feet long by three and a half broad, and three feet deep, and that contains about 550 gallons, which, according to the foregoing proportion, requires about two bushels and half a peck of lime. With this liquid, after the lime has subsided, give the trees a good watering, observing to throw a considerable part of it under the leaves, by a barrow engine; this should be repeated once a day, for six days, which will destroy all the aphides. The engine that I would recommend is that of the late Mr. Winlaw's construction, which may be had of Messrs. Chieslie and Yowle, No. 72, Margaret Street, Cavendish Square.

If you find the insects begin to make their appearance again, apply the powder as before directed, and repeat the watering.

Particular Directions for using the Lime-Water.

Take the clear water after the lime has settled, fill the engine with it, and give the trees a good watering, throwing it with as much force as you can under the leaves; pressing your fore-finger over the mouth of the pipe to spread the water like the falling of small rain, which you may very easily do, at the same time wheeling the engine backwards and forwards, that no part of the tree be missed. This should be done in cloudy weather, or when the sun is off the wall. If the trees are on an East wall, you may begin to water them about half past eleven o'clock; if on a North wall, you may water them the first thing you do in the morning; and if on a South wall, at four o'clock in the afternoon; repeating the watering for at least six days successively. But if there be cold Northerly and Easterly winds, or frosty nights, the watering should be discontinued till the weather is milder.

Be always careful that your trees get dry before night, and be sure never to water when the sun is on them; nor

* If it be a leaden cistern, a little loam, enough to cover the bottom, must be thrown in, and then trod down, before the lime and water are put in: The loam will prevent the lime from corroding the metal.

yet water them with the grounds of the lime, which will make the trees look very unsightly, and also injure the leaves.

When aphides are numerous at the ends of the shoots, the leaves there will be curled up; these should be all stript off, and the insects crushed with the foot.

Of the Acarus.

The Acarus, or Red Spider, is one of the most destructive insects that can infest plants, particularly in forcing-houses.

These insects have no wings, and the female is oviparous.

There are no less than 82 species of this genus. The acarus is very common on trees, particularly the currant, on the fruit of which it is frequently seen running.

These insects attack the vines, nectarines, peaches, and cherries; and forced French beans are very subject to their depredations, as are also peaches and nectarines on the natural wall, in hot weather. Melons in frames are very much infested with them. I once saw a ridge of melons, of seventy lights, so much injured by them, that when the fruit was full-grown, it was good for nothing, and the stems and leaves were completely exhausted of their moisture by these insects feeding on them. They are equally hurtful to most exotics in hot-houses.

The best thing that I know for destroying these pernicious insects is moisture; which will also destroy many other insects in hot-houses.

Frequent watering of wall-trees, standards, &c. with lime-water (the making and using of which is described in the directions for destroying the aphis), and throwing it plentifully on the underside of the leaves, where the acarus is generally found, will in a short time extirpate that destructive insect.

For plants, &c. in hot-houses, I would recommend using water only, and in the following manner:

Between three and four o'clock in the afternoon, fill the barrow engine with soft water, or such as has been exposed to the sun all day and wheel it along the foot-paths of the house, where they are wide enough to admit it, and sprinkle all the plants, pressing your finger on the top of the pipe to spread the water like a fine shower of rain, playing also against the top lights and shelves till the water stands an inch deep in the paths of the house*. If you cannot conveniently get the engine into

* I have lately seen a small copper engine, made by Mr. Philips, engine-maker, Blackfriars road, which answers very well, when a barrow engine cannot be got into the house.

the house, open the front lights, or when there are no front lights, slide down the top lights, and throw the water in it at the front or top. When you begin this operation, if in the inside, every light must be shut; and if you throw the water in at the front, you must keep only one light open, which shut immediately when you have sufficiently watered that part of the house opposite to it; and, then opening another light, proceed as before; and so on, till the whole is properly watered. The house must then be kept close shut till next morning; this will cause such an exhalation from the glass, tan, (if there are any tan-beds in the house,) &c. that the plants will be covered all over with the vapour; which will infallibly destroy the cocci, aphides, and other insects; but the watering must be repeated every afternoon, during hot weather only. By this you will also save a great deal of labour in watering; but such plants as require much watering should be watered before you begin to sprinkle the house. Before morning the plants will have imbibed all the moisture, and the paths will be perfectly dry.

When I lived at the Botanic Gardens, Chelsea, I observed in hard winters, when we were obliged to keep strong fires in the stoves night and day, that the plants which stood on shelves in the dry stoves were so scorched up that the leaves used to drop off, as from deciduous trees in autumn, which gave them a very disagreeable appearance. This induced me to consider what could be done to prevent it; when the following method occurred to me: About eight in the morning, when the sun shone out, and there was the appearance of a fine day, I threw in water till it covered the floor, which was of tile, from one to two inches deep, and kept the house shut the whole of the day, unless the thermometer rose to about eighty degrees, which seldom happens at that season of the year; in that case, I opened the door to admit a little air. By the middle of the day, the water was entirely exhaled, and the floor perfectly dry. This I used to repeat two or three times a week, in sunny weather; the plants in about a week's time began to throw out their foliage, and in a fortnight or three weeks they were in full leaf. This success induced me to take the same method with the tan stoves and other houses in summer, when troubled with insects; and I had the satisfaction to find that it had the desired effect.

Of the Acarus on Melons.

As we are now treating of insects, although it may look like a departure from my original plan, I hope that some instructions for destroying the red spider on melons will not be unacceptable.

Melons, in dry weather, and with a dry heat, are very apt to be infested with the red spider; and you may always observe the symptoms long before you can see these insects with the naked eye, by the leaves curling and cracking in the middle. Whenever you observe them in that state, in fine warm sunny weather, I would recommend watering them all over the leaves from a watering pot with a rose, or an engine, about six in the morning; and about eight o'clock shade them with mats, if the sun shines, and shut the frames close down till about eleven; then admit a small quantity of air, letting the mats remain till about three in the afternoon, when they should be taken off. Shading with mats will prevent the leaves from being scorched by the sun while they are wet. If the wind be South or South West, I would recommend watering them again about three in the afternoon, shutting them up close to keep the heat in, which will cause a strong exhalation, and destroy the spiders, as they by no means love moisture. In watering, throw as much as possible on the underside of the leaves, where the insect generally lodges; the vines may be gently turned, taking very great care not to hurt them; by which means you can easily throw the water all over the underside of the leaf; which must be done in a gentle shower from the engine, or from a watering-pot with a rose, so as not to wash up the mould on the plants, at the same time throw great plenty of water on the lights and sides of the boxes. After you have done watering, lay the vines gently down again in their former position. If a sunny day, let the mats remain as before directed until the leaves of the plants are perfectly dry, admitting air according to the heat of the day.

Before the frames and lights are used, I would recommend washing them well, both inside and out; first, with clean water, and then with soap-suds and urine mixed; using a brush or woollen rag in the washing; this will kill the eggs of the spiders and other insects that may have been deposited the preceding season.

When the ridges are fit for putting the mould on for the hills to plant the melons in, it should be from a foot to fifteen inches deep, and the rest of the bed should be covered with light mould, or rotten leaves, about one inch deep to keep down the steam. Take care not to make the hills too broad at first (a wheel-barrow full and a half will be enough for one hill), and observe that the heat is not too great, which will burn the mould and the roots of the plants. You will know when the beds are of a fine temperate heat, from sticks stuck in at different parts of the bed, by the feel of your hand, and the sticks having a pleasant sweet smell.

It will be very proper to water the hills, with a watering-pot having a rose, once a day for two or three days before you put in the plants, keeping the lights shut, which will destroy any eggs of the spider that may yet remain in the crevices of the boxes and lights.

The day on which you mean to put in the plants, you should give the beds a great deal of air, to let out the steam that has been penned in; then turn over the hills, and put in your plants about three o'clock in the afternoon, making a hollow circle round the bottom of each hill, to separate the mould of the hills from that on the bed, which will suffer the steam to evaporate more easily; then watering the plants, shut them down till next morning, admitting air according to the heat of your bed, taking care not to give too much till your plants are well rooted in the hills, which will be in a couple of days; it will also be necessary to shade them in the heat of the day, to prevent the plants from flagging.

In cold frosty weather, you must by no means sprinkle the plants, as the frost in the night will infallibly bring on the canker.

Soft water should be used in sprinkling, or such as has been exposed several days to the sun. If the water be very hard, put some wood-ashes into it, and stir it up two or three times a day, it will be fit for use in the course of two days; let the ashes subside, and use the clear water only.

If your melons have been infested with the spider in the preceding year, by no means use any of the mould again.

Of the Coccus.

The Coccus is a genus of insects belonging to the order Hemiptera, whose males have wings, but the females have none.

The most common insects of this genus are those which attach themselves to peach, nectarine, and pear-trees; and when full grown they have somewhat the appearance of a boat with the keel turned uppermost. These are apparently without feet, eyes, or other members, while in this state; and so much resemble some kinds of galls, or excrescences of the bark, as frequently to be taken for such. A thin film of a white cotton-like substance is interposed between the flat part of the body and the tree. This is common, in a greater or lesser quantity, to all the species, and appears at first all round the edge as a kind of cement to join it to the tree.

The males are very few in proportion to the females, and not nearly one fourth of their size; they are beautiful little flies,

which, after a short, but active life, terminate their existence without having tasted food, being provided with no sort of organs for that purpose.

Peach, nectarine, and pear-trees, are very much infested with these insects: They frequently cut through the bark, and the trees then appear as if they had been scratched by cats. I have seen some trees with this appearance all over them*.

When these insects first appear on the bark, they should be scraped off with a wooden knife, and the stem and branches of the tree washed with soap-suds and urine, applied with a stiff painter's brush. This should be done in February, before the buds begin to come out. But if the outer bark is perforated, it must be cut or pared off with a long knife; and if you find any brown spots in the inner bark, they must be carefully cut out. This disease is one great cause of the canker, and of the death of the tree. [*See Plate* 9. *Fig.* 3.]

When this disease has made its way through both barks, as is often the case, the branches on each side of the tree may be cut close to the stem, if it has an upright one; but if the tree be trained fan-fashion, the best way is to head it near to the place where it was grafted. I have headed old pear-trees which were so dead, except a small strip of live bark on one side, that you might rub the bark off them as easily as off a bundle of faggot-sticks that had been cut upwards of a year; yet these trees have shot out fresh branches to the length of seventeen feet in two years, and produced fine fruit the second year. Apply the composition immediatly after heading, or cutting, or paring off the deceased bark.

A very destructive species of the coccus tribe has lately done incredible damage to the apple-trees in the nurseries and gardens in the neighbourhood of London. Some Nurserymen have lost several thousand apple-trees in one year. These insects attach themselves to the bark by their suckers, and, by feeding on the juices of the tree, rob it of its nourishment. Such trees as are infested with them have a sickly appearance. I am happy, however, in being able to say, that I have nearly extirpated them from his Majesty's gardens at Kensington: But, as our neighbours do not pay the same attention to their trees as we do to ours, the insects frequently emigrate to us; this obliges me to be very attentive to their first appearance; and as I take the earliest opportunity of destroying them, the trees suffer very little from their depredations.

* This, if I am not much mistaken, is the very insect that makes such dreadful ravages amongst the peach-trees, in America.

These insects make their nests generally where branches have been cut off, or in hollow places, where the canker has eaten holes in the trees. Their first appearance is like a white down; on touching, or rubbing them, they tinge the fingers of a crimson colour, like cochineal. If suffered to remain long on trees, they take wing, like aphides. The method that I have followed for these ten years to destroy them is as follows:

I rub the places where their nests are with an old brush, such as painters use, till they are all cleaned off; and if the part be canker-eaten, I cut it clean out with a knife or chisel: I then take of soap-suds and urine equal parts, and with this I wash the wound and the bark all round it; and with a brush apply the composition mixed with wood ashes and the powder of burnt bones, covering the wound all over with it. Afterwards I shake some of the powder of wood-ashes and burnt bones, mixed with an eighth part of unslaked lime finely powdered and sifted, over the hollows, or where knobs have been cut off.

At the same time that the trees are cleared of the cocci the caterpillars should be picked off.

The first time that I observed the new coccus, which has done so much mischief to the apple-trees about London, was, in a garden of my own at Chelsea, about the year 1782 or 3; and, as far as I can learn, they were imported, among some apple trees, by the late Mr. Swinton, of Sloane street. Mr. Swinton afterwards removed his nursery to the King's road near Chelsea College, which now goes by the name of the Foreign Nursery.

All the gardens about Chelsea and Kensington are now very much infested with these insects; and I have frequently seen them in several other parts of the kingdom.

Doctor George Fordyce purchased several apple-trees at the sale of the effects of Mr. De la Tour, editor of the Courier de l'Europe; all of which were from Mr. Swinton's nursery, and all infected with these insects. The doctor gave me twelve of these trees, which I planted, and very soon cleared them of the coccus.

Messrs. Lee and Kennedy, Nurserymen at the vineyard, Hammersmith, Messrs. Grimwood and Co. Kensington, and Messrs. Gray and Wear at Brompton Park nursery, have applied train oil, laid on with a painter's brush, with a view of destroying these insects, but they have not been successful*.

* Since writing the above, I have been informed, that the Farmers in Kent likewise use train oil; but if they would make a fair trial of urine and soap-suds, they would find it more effectual, and it would cost nothing but la-

Indeed, I by no means approve of applying oil to trees upon any account, as, by shutting up the pores, it is apt to render them bark bound.

Of Caterpillars.

Caterpillars are very destructive to cabbages, and all the brassica tribe, and frequently make depredations on trees, particularly the apricot. They should, therefore, be carefully observed and picked off. A few years ago, Kensington Gardens were very much infested with them; but by carefully picking and destroying them, and all the aurelia that could be come at, very few are now to be seen. During the winter and spring, every chrysalis that can be found under the copings of walls, on gates, palings, &c. should be destroyed. Many may also be found about the doors and windows of houses, under the eaves, and in many other places.

The best method of preventing trees from being infested is to scrape the stems with a piece of bone or wood made in the form of a knife, taking care not to bruise the bark; and afterwards to wash the tree and wall with an equal quantity of soap-suds and urine mixed.

As soon as the leaves are off the trees in autumn, they should be raked and swept up; then carried to the melon ground and mixed up with other leaves and dung for hot-beds; by this means you will get rid of a great number of eggs of insects that are deposited on the underside of the leaves. Then wash all the stems of the trees, and all the ends of the buds taking care not to hurt the buds: In doing this, what falls will destroy the slugs that take shelter on the off-set of the wall and in the borders, before they are dug for planting lettuce, endive, &c. This washing should be repeated about the beginning of February, which will destroy any eggs of different insects that may still remain about the trees. A painter's brush may be used for laying the mixture on the trees, and a soft broom, or a brush made of the ends of garden matting, for washing the wall. The matting seems preferable, as, being soft and flexible, it will enter the holes and crevices.

The mixture that falls on the border and off-set of the wall, in this second washing, will destroy those slugs and insects

hour; besides, what falls on the borders will make a fine manure. The urine and soap-suds should be saved in tubs in winter; and, as it will be too strong for use in summer, it may be lowered by adding water. This mixture will also be found effectual in killing slugs that harbour about the roots of the trees and bottoms of the walls. When it soaks into the ground, the slugs will work their way, and may easily be killed by throwing a little more of the mixture on them from a watering-pot with a rose.

that made their appearance early. The stems and branches of the trees may be washed two or three times, or oftener, in the spring, before the buds begin to swell; but the branches must not be rubbed after the trees come into flower; you may, however, sprinkle them over with the mixture from a watering-pot with a rose just before the buds begin to open, but by no means after they are open; as it will, by its glutinous nature, render the bloom liable to be scorched by the sun.

I would recommend the above washings, &c. for all trees, standards as well as those on walls; particularly apple, cherry, and plum-trees.

If any caterpillars should remain, they will be discovered by the curling of the leaves; for every curled leaf has one or more caterpillars, or other insects, in it; they should therefore be carefully pulled off, and the insects crushed: If neglected, they will frequently devour every leaf, leaving the tree quite naked, and of course destroy the fruit for that season.

There are some gregarious sorts of caterpillars found in great numbers enclosed in a net, or bag, resembling a strong cobweb, and fixed to the branches of trees and shrubs. These nests should be carefully picked off, and the insects crushed, by which vast numbers of them will be destroyed. After you have cleared the tree as well as you possibly can, wash it as above directed, which will destroy those stragglers that may still remain on it.

Observe, that after the trees come into flower, instead of washing them with urine and soap-suds, they should be well watered with clear lime-water, mixed with tobacco-water.

There are several species of moths that in the caterpillar state are very hurtful to plums and other fruit-trees: It will, therefore, be a great advantage to destroy them on their first appearance.

It would be of great service to get acquainted as much as possible with the economy and natural history of all these insects, as we might thereby be enabled to find out the most certain method of destroying them. Were a few of each sort of caterpillars put in a box or case, and fed with leaves of such trees as they generally live upon, they might be observed from time to time until they came to the chrysalis, and from that to the moth or butterfly state, and thus a more perfect knowledge of them might be obtained.

It would be necessary to have separate divisions in the case for each different species, and to put some earth in the bottom of each division, which should be moistened occasionally, as some of them bury themselves in their chrysalis state, while others adhere to walls, gates, or palings.

Fresh leaves should frequently be put in, and the box or case covered with a piece of fine canvas, or gauze, to admit the fresh air.

At the same time that the trees are cleared of the coccus, aphis, or any other insects, the caterpillars should be carefully looked for and picked off. You will observe, that they shelter themselves at the ends of the shoots, in the flowers, and at the bottom of the foot-stalks of the flowers. There are two or three sorts that infest fruit-trees, two of a brown and one of a green colour. Four years ago the apple-trees suffered very much by a blight; they had all the leaves eaten off, and, of course, bore no fruit. I first had all the caterpillars carefully picked off: I then cut out the cankered wood, and washed the trees with a mixture of urine, soap-suds, and fresh cow-dung, sufficient to bring it to the consistence of paint, laying it on all over the stems and branches of the trees, particularly where the decayed parts were cut out: After this, the trees recovered in a manner that surprised every one who saw them; and they still continue in a thriving state, and bear very fine fruit.

In 1795 I used the above method with a great many dwarf apple-trees; and the effect was so visible next season, that all who saw them took notice of the great difference between them and the remaining trees, which we had left to nature; the latter bearing no fruit, and their leaves being eaten by the caterpillar, while the former have borne fine clean fruit ever since.

The trees, twenty-five in number, which I left to nature, continued in a sickly state for three years, neither bearing fruit nor putting forth shoots. After the third year I headed them down, scraping the stems and cleaning off the insects; they are now recovered, having made as fine wood as the others, and are in a healthy flourishing state.

Fig. 2, *Plate* 9, represents different states of a kind of moth, whose caterpillar has for many years done great mischief among pear-trees on walls. One wall in particular, in Kensington Gardens, was very much hurt every year, for several years successively. I imagined that it had been the effect of lightning, or a blight; till, on picking off the caterpillars, we found a small sort in its case, sticking to the leaves, as

at *a*. [*See the Description of the Plate.*] All the first leaves were destroyed by the caterpillars: I was, therefore, rejoiced that I had found out the cause of their being so much injured every year, being perforated in many places, and dropping off very early.

The Chermes.

Chermes is a genus of insects belonging to the order Hemiptera, and of which there are twenty-six species. They take their specific names from the different plants which they frequent; as the Chermes Graminis, or Grass Bug; the Chermes Ficus, or Fig-Tree Bug, &c. The latter is one of the largest of the genus, and is brown above and greenish beneath. It has four long wings, which are placed in form of an acute roof. The larva, which is of an oblong form, has six feet, and its motion is slow. When it is attempted to catch the chermes, it makes its escape rather by leaping than flying, by means of its hinder legs, which play like springs. Some of these insects have a manœuvre worthy of notice. Several species are provided at the extremity of their body with a small sharp-pointed implement, but which lies concealed; and this they draw out in order to deposit their eggs, by making a puncture in the plant that suits them. By this method, the fir-tree chermes produces that enormous scaly protuberance which is to be found at the summit of the branches of that tree, and which is formed by the extravasation of the juices occasioned by the punctures. The young larvæ shelter themselves in cells contained in the tumour. The directions for destroying the coccus are applicable to this insect.

The Thrips.

The Thrips, of which there are eleven species, also belongs to the order Hemiptera. This insect is, in general, so small as to be scarcely discerned by the naked eye. It is, however, very pernicious to fruit-trees, sometimes attacking the fruit as well as the leaves. To destroy this insect, follow the directions given for destroying the coccus.

The Phalæna, or Moth.

There are numerous species of this well-known insect, and their caterpillars differ greatly as to size, shape, and colour. All of them, after casting the slough several times, spin their cod, in which they are transformed to chrysalids. They are frequently found in this state, rolled up in the leaves of fruit-trees; particularly those of pears, plums, and cher-

ries. These leaves must be carefully picked off, and the insects crushed: The trees must then be washed with clear lime-water mixed with tobacco-water. This washing would be found useful when the insect is in its larva state, after picking off and crushing as many of the caterpillars as possible. *See Caterpillars.*

Sphinx or Hawk Moth.

There are 165 species of this genus, ten of which are found in Great Britain and Ireland.

The name of Sphinx is given to this genus on account of the singular attitudes of their caterpillars, who apply the hinder part of their body to a branch of a tree, and hold the rest of it erect, like the Fabulous Sphinx. Most of them spin their cod under ground. The sphinges appear either early in the morning, or after sunset, and fly heavily and sluggishly, often emitting a kind of sound. Many of the caterpillars are green and smooth, some brown, or yellow, and others are spotted, or have belts. The sphinx may be destroyed by the same method as the phalæna.

The Phalæna Bombyx Neustria.

The Phalæna Neustria, or Lackey Moth, lays its eggs in rings round the branches of fruit-trees, exhibiting the appearance of a necklace. These being very hard, and adhering close to the bark, must be cut off with a sharp knife, taking care to wound the bark as little as possible; and wherever the knife enters, it will be necessary to rub in a little of the composition.

The Papilio.

The Papilio, or Butterfly, belongs to the order Lepidoptera. There are a great many species of this genus, generally distinguished by the colour of their wings. The more common sorts, with their caterpillars, are so well known, as to render a description of them unnecessary. The caterpillars and chrysalids must be carefully picked, and the trees well watered with clear lime-water and tobacco-water mixed.

The Cicada.

The Cicada, Frog-Hopper, or Flea-Locust, is a genus of insects belonging to the order Hemiptera. The larvæ of several of this genus evacuate great quantities of a frothy matter upon the branches and leaves of plants or trees, in the midst of which they constantly reside, probably for shelter against other

animals; perhaps, also, the moisture of this foam may serve to secure them from the sultry rays of the sun.

As the froth emitted by these insects is very unsightly, and as they are also hurtful to trees, by eating the leaves, they should be destroyed by rubbing off the larvæ with the hand, and afterwards watering the tree plentifully with soft water.

Of Earwigs.

Earwigs are very destructive to fruit, particularly peaches. The method that I would recommend for destroying them, and which I have long pursued with success, is as follows:

Take old bean stalks, cut them about nine inches long, tie them up in small bundles, with some pack-thread, or with small yellow willows; and hang them about on different parts of the trees. The first thing you do in the morning, being provided with a board about eighteen inches square, and a small wooden trowel, take down the bundles of bean stalks, one by one, strike them against the board, and with your trowel kill the earwigs as they fall out of the stalks. If you follow this up every morning (or every other morning), you will be able to keep them under.

The foregoing method will answer for any sort of trees infested with earwigs. In some years I have seen a great part of the fruit, especially the smooth-skinned sorts, destroyed by these insects and a small green caterpillar; and in a scarce year of fruit, the leaves of peaches are frequently destroyed by them.

Of the Ant.

The Ant is very destructive to fruit, especially the peach when ripe; you will frequently see these insects travelling all over the trees, and sometimes the fruit will be filled with them. The best method that I have found to destroy them is, to get a sharp pointed wooden stake, or an iron crow, if the ground be hard, and with it bore a hole not far from the stem of the tree, and as deep as the ground will permit. By stirring the earth, you will set the ants in motion: Then work your stake or crow round the sides of the hole, making them as smooth as you can; the ants will come to the mouth of the hole and tumble in, and by the shape of the hole and smoothness of its sides, will be prevented from climbing up again. When you see a great many in the bottom of the hole, pour in some water from a watering pot; and thus you may drown thousands of them.

This is an easy and simple way to get rid of ants. Some are of opinion that they do good by eating the aphides from off

the trees; but I have always thought that they do much more hurt than good.

You may likewise destroy many of them by mixing quick-lime with soot, and laying it along their roads where you see them thickest; but where you can come at their nests, the best way is to put a piece of quick-lime into it, and pour as much water over the lime as will slake it, the heat of which will destroy them: When you have poured in the water, cover the lime with a turf or a little earth, which will render it more effectual, by confining the heat. You may slake the lime with a mixture of urine and soap-suds, which will render it still more effectual.

If a little of the powder of stavesacre be laid on the ground round the stem of a tree, it will prevent ants from ascending it.

Slugs.

These insects are frequently found harbouring about the foundations of walls, and about the roots of pease, lettuce, &c. They may be picked off and killed, by putting them into a pot in which is a little fine unslaked lime; or the ground where they are should be well watered with soap-suds and urine, mixed with tobacco water. When they are numerous on the surface of the ground, which frequently happens after rain, or in a dewy morning, fine unslaked lime thrown over the borders, &c. will destroy them. But I prefer the above mixture, which, if the ground be well watered with it, will bring them up out of their holes, when they very soon die: It will also destroy their eggs, which they always deposit in the earth.

Snails.

Snails, during the winter, gather themselves together in clusters; and in that season are frequently found in great numbers behind wall-trees, and in holes of the walls. They must be carefully picked off and crushed, which is the only effectual way of getting rid of them. If any should escape, they should be destroyed as they make their appearance in the spring. As they also deposit their eggs in the ground, the borders should be well watered, as directed for slugs.

Of Wasps and Flies.

As soon as the Wasp and Large Flesh Fly (which are very destructive to all kind of fruit, particularly grapes) make their appearance, get ready several bottles, or phials; then mix up grounds of wine, or beer, with sweepings of sugar, honey, or grounds of molasses, and with this mixture fill the bottles half,

or three quarters full, then place some of them at the bottom of the wall and hang a sufficient number up by a piece of yellow willow or pack-thread on the nails against the walls in different places, observing to empty them frequently, as they fill with flies and wasps; first pour the liquor into an empty bottle, and then shake out the dead insects, crushing them with your foot, that none of them may revive: then pour back the liquor into the bottles and phials, as at first. In this manner you may destroy a great many before the fruit becomes ripe. If you begin to hang up the bottles as soon as you see the fly, which comes much earlier than the wasp, you will be able to destroy great numbers of them, and will have the bottles ready for the wasps when they make their appearance. The fly will be found as destructive as the wasp to grapes.

When the weather is hot, and the wasps are numerous, if they do not enter the bottles fast enough (which will happen when the fruit is very ripe), take a little oil in a cup, and with a feather dipped in it touch their backs, and they will instantly drop down: On observing, you will find them turned black and green by the effects of the oil*. It is amazing what numbers a diligent person can destroy in this way in a day. Oil has the same effect on flies; but it is very difficult to touch them with it as they are so quick in their motions.

Of Birds.

When fruit begins to ripen, birds will attack it. The best preventive in this case is, to cover the trees with nets, or buntine, a sort of cloth of which ships colours are made. These will admit a free circulation of air to the fruit, and will soon dry after rain: They will also be a good covering for the trees in spring, in cold, wet, or snowy weather.

Rats and Mice.

These vermin do a great deal of mischief in gardens, in sheds, and other places, where they frequently destroy great quantities of beans, pease, and other seeds; it is, therefore, the interest of every gardener to kill as many of them as possible.

There are different ways of destroying them, by traps, and by poison; but I would advise never to use arsenic, or corrosive sublimate, for that purpose, except under particular circumstances, as they are deadly poison: Nux vomica will generally answer the end as well, without the danger. In case

* Oil kills insects by closing up the lateral pores by which they breathe.

of being accidentally tasted by children or others, it will be attended with no worse consequence than leaving a disagreeable bitter taste in the mouth; unless, indeed, a considerable quantity of it be taken, which would, no doubt, prove fatal*; as it is possessed of a strong narcotic quality, and is found a certain poison for dogs and cats, as well as for rats and mice. All domestic animals should, therefore, be kept from the places where the poison is laid. A very good way to prevent accidents is, to enclose the traps in cases, having holes in the ends of them large enough to admit the rats, but small enough to exclude dogs, cats, &c.

A Bait for Rat Traps.

Take a pound of good flour, three ounces of molasses, and six drops of the oil of carraways; put them all in a dish, and rub them well together till they are properly mixed; then add a pound of crumbs of bread.

Set the traps, baited with some of the foregoing mixture, as near their haunts as possible; but, for two or three days, so as not to fall or strike on the rats going in, and let them have free liberty to go in and out at pleasure; this will make them fearless. Lay some of the bait at the rat-holes, and scatter a little of it quite up to the traps, and so on to the bridge of each trap, where you may lay a handful. It may also be proper to scent the traps with the following mixture, for the purpose of enticing the rats into them.

Take twenty drops of oil of rhodium, six or seven grains of musk, and half an ounce of oil of anniseed; put them in a small phial, and shake it well before using: Then dip a bit of twisted paper, or rag in the mixture, and rub each end of the trap with it, if a box-trap, and put two or three drops on the bridge, leaving the paper or rag in the trap. Of whatever kind the trap is, it should be scented: Once in a twelvemonth will be sufficient. Then throw some chaff, mixed with a little wheat, about the bottom of the trap, in order to deceive the rats; for they are very sagacious, and will not enter a suspicious place. This will be necessary to be done only at the first time of setting the traps; for after some rats have been caught and have watered and dunged in them, rats will enter boldly when they find others have been there before them: Do not therefore, wash or clean out the trap, as some people do before they set it again; but let the dung and urine remain in it. Keep

* It has been taken in doses from five to ten grains, twice a day, in intermittents and dysenteries.

the places where the traps are set as private as possible; and when you set them for catching, mix no bread with the bait, as the rats will in that case be apt to carry it away.

When you find the holes quiet, and that no rats use them, stop them up with the following composition: Take a pint of common tar, half an ounce of pearl-ashes, an ounce of oil of vitriol, and a good handful of common salt, mix them all well together, in an old pan or pot. Take some pieces of paper, and lay some of the above mixture very thick on them, then stop the holes well up with them, and build up the mouth of the holes with brick, or stone, and mortar: If this be properly done, rats will no more approach these, while either smell or taste remains in the composition.

To kill Rats in Places where you cannot set Traps.

Take a quart of the bait already described, then rasp into it three nuts of nux vomica, and add a quarter of a pound of crumbs of bread, if there was none before; mix them all well together, and lay it into the mouth of their holes, and in different places where they frequent; but first give them of the bait without the nux vomica for three or four succeeding nights; and when they find it agrees with them, they will eat that mixed with the nut with greediness.

Rats are frequently very troublesome in shores and drains. In such case, arsenic may be used with success, as follows: Take some dead rats, and having put some white arsenic, finely powdered, into an old pepper-box shake a quantity of it on the foreparts of the dead rats, and put them down the holes, or avenues by the sides of the shores at which they come in; this puts a stop to the live ones coming any further; for when they perceive the arsenic they will retire immediately; whereas, if you were to put down the dead rats without the arsenic, the live ones would eat them.

What has been said relates chiefly to rats; we shall now give some directions for destroying mice.

Take a quart of the bait prescribed for rats before there is any bread mixed with it; then take four nuts of nux vomica, and rasp them very fine, otherwise the mice will pick out the food from it, on account of its bitter taste; rub them well together; lay some of it on a piece of paper, or, if without doors, on a piece of tile, removing all other food from the place, and it will kill all that eat of it. What is not eaten, take away in the morning, and replace it at night. If this be in a garden, shelter it with boards, or tiles, that it may not get wet.

I would recommend setting fourth-figure traps in gardens: These are so well known to gardeners, that they need no description. They may be baited with garden beans.

Traps are also made by stringing garden beans on a piece of fine pack-thread, as you would string beads, then driving in two small stakes at the breadth of a brick from each other, and setting up a brick, or stone, or a board with a weight on it, inclining to an angle of about forty-five degrees; then tie the string, with the beans on it, round the brick and stakes, to support the brick in its inclining position, taking care to place all the beans on the under side of the brick. The mice in eating the beans will also cut the pack-thread, and so disengage the brick, or stone, which falling on them kills them.

There is nothing new in the foregoing method; but, as field-mice will seldom enter a close trap, I thought proper to mention it.

As mice are frequently carried into gardens with straw, or litter, and are there extremely hurtful, destroying beans and pease in spring, as also lettuces, melons, and cucumbers in frames, it is necessary to take some pains to destroy them.

OBSERVATIONS

ON THE

DISEASES, DEFECTS, AND INJURIES,

IN ALL KINDS OF

FRUIT AND FOREST TREES.

INTRODUCTION.

IT redounds very much to the general honour of the British nation, as well as to the particular credit of the Society for the Encouragement of Arts, Manufactures, and Commerce, and several other Associations for the Advancement of Agriculture, &c. that the face of the country has, in the course of the present century, received so much improvement, and such added beauty.

The premiums and honorary marks of distinction held forth by these societies have excited a spirit of emulation, or suggested a spirit of improvement, among persons of every rank of life, which have been productive of many discoveries of no common benefit in their present effects, and of great promise from their future consequences, to the community at large.

But, notwithtsanding the strides which modern agriculture has made towards perfection in many points, there is one particular and very interesting branch of this science which improvement has not yet embraced, viz. the growth of timber, and the culture and management of plantations both of fruit and forest-trees.

The profession of a gardener has been the employment of my life; and during a long succession of years, it has been an object of my particular study to investigate and discover the latent causes of those various defects and diseases to which all kinds of trees are more or less subject, and the injuries resulting from them, by obstructing the fertility of fruit-trees, and diminishing the quantity, as well as quality, of timber in forest-trees.

Having acquired a competent knowledge of the evil in all its appearances and effects, my attention was directed toward the discovery of such a remedy as might not only counteract the progress of these diseases in fruit and forest-trees, but also afford nature such powerful assistance, that she might be enabled to renovate, as it were, fertility in the one, and sound timber in the other. Of my success in these endeavours to promote the general advantage of this country in a matter so connected

with its best interests, I have that clear conviction which I trust, will be hereafter communicated to every part of the kingdom where the application of my experience shall be made and prosecuted.

The inquisitive spirit which accompanied my professional pursuits, with the natural desire of improving my private practice in the management of the various kinds of trees under my care, led me by degrees to this discovery. The idea, however, of making it public never occurred to me, till the many trials and experiments that I had repeatedly made, both on fruit and forest-trees, in the Royal Gardens at Kensington, had attracted the notice of many persons of high rank, as well as philosophical eminence, and prompted them to favour it with a particular examination. Their investigation of my process and method of curing the defects and injuries which, from various causes, those trees had sustained, by producing conviction in their minds, gave the most flattering encouragement to me. Indeed, the application of the remedy had been attended with such uninterrupted success, that its salutary and certain effects were evident to every one who favoured it with an attentive observation. Many, who visited me with the most decided opinions against the successful application of any remedy for trees in a very advanced state of decay, did not hesitate, on an investigation of the subject, to acknowledge that their prejudices were not only removed, but that their judgments were perfectly convinced of the powerful efficacy of the discovery, and the very great advantages which, both in an individual and a national view, might be derived from it.

Among the more early enquirers, were the Commissioners appointed by Parliament to examine into the state of the woods, forests, and land revenues of the crown; who, in the course of their surveys, had perceived a great number of trees in the Royal Forests to be materially injured; and their anxiety to prevent the loss or further damage of so much valuable timber induced them to honour me with a letter* concerning the effects of injuries done to oak-trees, and the means of preventing or curing defects in timber from various causes therein stated.

In reply to this inquiry of the commissioners, I did myself the honour of addressing them two successive letters†.

Shortly after the date of these letters the commissioners favoured me with a visit at Kensington, to examine the process

* See No. 1, of the Appendix.

† See No.s 2 and 3, of the Appendix.

and mode of cure which I had adopted, as well as the effects which my remedy had produced on trees of various kinds and ages to which it had been applied. Those gentlemen seemed, in a most particular manner, to interest themselves in ascertaining the utility and benefit that might arise from the application of it to many thousand valuable trees in his Majesty's woods and forests, which had received injuries of such a kind as, if left to the unassisted efforts of nature, would occasion a very considerable diminution in the value and the quality of the timber, and might even terminate in their entire ruin*.

This very attentive and minute examination of the several objects of their inquiry being followed by the clearest conviction of the great public utility which would result from a general application of the remedy, the commissioners were pleased to make a representation of it to the Lords of his Majesty's Treasury, under whose sanction it was submitted to the consideration of the House of Commons by Mr. Rose, on the 24th of July, 1789; and on his motion, an humble address was presented by that honourable house, to his Majesty on the subject†.

In consequence of this address, a Committee of Members of both Houses of Parliament undertook, at the instance of the Lords of the Treasury, to investigate the efficacy of my composition; for which purpose, they most attentively examined the state, condition, and progress of cure, of the decayed and injured trees in Kensington Gardens, to which it had been applied, in experiments of various kinds, for upwards of seven preceding years; and, after having by a very full enquiry, strict investigation, and the most minute attention, satisfied their minds in every particular, they reported to the Lords of the Treasury the result of their examination, expressing their unanimous opinion and conviction, that "The Composition was a discovery which might be rendered highly beneficial both to individuals and the public." That report, and also a letter pre-

* Mr. Nichol of Redbridge, Hants, Purveyor for Portsmouth Dock, informed me that the average of the damaged timber brought to that place was never less than one fourth of the total quantity of timber brought in annually; and not unfrequently it amounted to a third. If, however, the trees that have received any injuries were prepared, and the composition applied as directed in this treatise, the cavities, or wounds, would be filled up with new and sound wood. And if recent wounds, occasioned by lopping or breaking off branches, were immediately dressed in a proper manner with the composition, the tree would sustain no injury; as the wounds would be healed and covered over with new and sound bark in a short space of time; so that there would not be found a foot of damaged timber.

† See No. 4, of the Appendix.

viously written to the Committee by the Commissioners of the Land Revenue, of which I have been favoured with copies, are, for the further information of the public, inserted in the appendix*.

Having been thus honoured by the unanimous approbation of persons so respectable for their rank, character, and knowledge, I proceeded to exert myself in making various additional trials and experiments, to enable me to give farther proofs of the efficacy of my composition, in restoring the powers of vegetation to trees so far decayed as to be of no value as timber, but which, from their situation as a skreen, or as composing part of a general uniform appearance in the Royal Gardens, it became a desirable object to preserve. Nor were my endeavours less successful in this subordinate experiment, than they had been in those which were directed by circumstances of superior interest; for I had the very great satisfaction to find, that in consequence of my treatment of trees in that state of decay which has just been specified, a few years growth has filled up unsightly chasms, and restored that uniformity to their local position, which young plants set in their places would not have accomplished in a long course of successive years.

The report of the committee having been laid before his Majesty, in consideration of the great utility and advantage which must arise to the country at large from the use of this composition, his Majesty was most graciously pleased to order a reward to be given to the author, for making known to the public the materials of which it is composed, with the method of preparing it, as well as the mode of its application; and, in order to diffuse the benefits of this discovery throughout the kingdom, an advertisement† has been inserted in the London Gazette, and in most of the town and country newspapers.

The very great importance to this country of securing a continued succession of good, healthy, and well-growing forest-trees, producing sound, unblemished timber, for supplying the various wants of the public, must be evident to every man's reflection; nor need it be observed, that numberless large trees, in the woods, parks, and forests, of this kingdom, are, from various causes, rendered unfit for use, and the timber so much damaged as to occasion a considerable diminution in its value. This evil arises, in some instances, from unskilful management, and in others from external accidents; among

* See No. *5*, of the Appendix.

† See No. *6*, of the Appendix.

which are, the ruinous effects of hurricanes and high winds, when the trees are generally left, in their wounded and disfigured state, to the accelerated operations of inevitable decay. It also not unfrequently happens, that the heirs of large estates, on coming to the possession of them, order great numbers of trees to be promiscuously felled, before they have attained a state of maturity, without paying the least attention to provide a succession of young trees to supply their place; by such inexcusable negligence defeating the ends proposed by the provident care and wisdom of their ancestors, depriving the public of a valuable source of timber, either for domestic purposes or national use, and reducing their country to a dependance on foreign produce for supplying the demands of her fleets and manufactures.

I shall esteem myself most happy, if, in giving this tribute of information to the general stock of public improvement, I should promote an influence that may excite noblemen and gentlemen, and proprietors of land of every denomination throughout the kingdom, to be actively solicitous in planting and preserving oak-timber, the native growth of their country; that Great Britain may never be under the dangerous as well as disagreeable necessity of trusting the safety of her seamen to the inferior texture and less durable quality of foreign growths; while the hardy oaks of England, which for ages past have been considered as affording the best timber in the world for this building, and may have been said to have brought home victory and commerce from every part of the globe, are no longer suffered to diminish, as they have done of late, to the manifest detriment and dishonour of our country.

Such an evil (and it is of no common magnitude) proceeds from the negligence and inattention of the landed men, who, from a spirit of patriotic ambition, as well as private interest, should pay a very vigilant attention to the maintaining of a succession of healthy, well-growing timber, for the service of their country, nor any longer suffer the internal resources of the kingdom to fail in furnishing materials for that great national object, the support of the British navy; as well as for the many various demands of domestic utility. By making such a provision for the public wants, they will add to their own immediate wealth, as well as to the fortunes of those who come after them: And, while I express my wishes that such general good designs may be put in universal practice, I may express my belief, that the discovery which I have made, and

which is now divulged to the public*, will facilitate the means of prosecuting them, to the essential advantage of the British Empire.

General Observations on the Diseases, Defects, and Injuries, of all Kinds of Fruit and Forest-Trees.

In the course of more than thirty years practice in cultivating, pruning, and keeping of garden fruit-trees, I have observed, that from natural causes, accidents, and unskilful management, they were subject to injuries of different kinds, which always diminished their fertility, and frequently rendered them wholly unproductive.

All trees that bear stone-fruit are liable to emit a gum, which, by producing a canker, proves fatal to the health and vegetation of the tree. Most forest-trees are also liable to what is called a bleeding, which proceeds from any injuries that obstruct the circulation of the juices. Of those which suffer from bad management or accidents, some are injured by unskilful pruning, and lopping at improper seasons of the year; and others by the violence of high winds, having boughs or limbs torn from their bodies; which being left in that state, exposed to all the inclemency of hard frosts, are often cracked or rent in the wood; or from heavy and soaking rains, the wounds imbibe so large a quantity of wet and moisture, as, by causing a fermentation with the natural juices, brings on disease, and in time destroys the health and vegetation of the tree. These, among other causes, tend to produce decay and barrenness in fruit-trees, as well as defects in timber, to the great loss of the public in general, as well as essential injury to the individual proprietor.

To remove these evils, and to prevent the ill consequences arising from the causes already described, I submit to the experience of the public a remedy discovered by myself, which has been applied with never-failing success to all kinds of fruit-trees, and has not only prevented further decay, but actually restored vegetation and increased fruitfulness, even in such as were apparently barren and decayed. It has produced also a similar effect on forest-trees, by restoring them to soundness of timber and healthful vegetation, and covering, as it were, visible nakedness and increasing decay, with fresh and vigorous foliage.

This remedy is a composition formerly applied in the manner of a plaster, but now in a liquid state, and laid over

* See No.s 6 and 7, of the Appendix.

the wounded or injured part of the tree with a painter's brush: It is of a soft and healing nature; possesses an absorbent and adhesive quality; and, by resisting the force of washing rains, the contraction of nipping frosts, and the effects of a warm sun or drying winds, excludes the pernicious influence of a changeable atmosphere.

The discovery of it is the result of much reflection and study during a long course of years, and of a great variety of experiments, made, at a very considerable expence, to ascertain the efficacious powers of the application. Nor shall I hesitate a moment to declare my firm belief, that wherever it shall be properly applied by the proprietors of gardens, orchards, and woods, it will be productive of all the advantage that can be derived from restoring as well as preserving vigour and fertility in all kinds of fruit-trees; as also from preventing decay, and promoting health and sound timber, in every species of forest-trees: And how great that advantage may be, it is in the capacity of every one to determine.

On the Management of Forest-Trees.

The received opinion and common practice of most professional men has been, to prune or top their trees, from the month of October, when the juices have been exhausted by the summer foliage, autumnal fruit, and general nourishment of the body of the tree, until the month of March, when the sap or juices, re-invigorated by nature during the winter's repose, begin to re-ascend and perform the annual function of cloathing it with fresh foliage, blossoms, and fruit. The reason of this practice is, that, the sap being fallen at that season of the year, it has been considered as the most proper period to lop off all superfluous growths; and the efforts of nature to heal the wounds thus necessarily given, (before the rising of the sap in the following spring) have been judged best for the safety and health of the tree. The danger of performing this service when the juices are in a more vigorous flow, as in the months of May, June, and July, has been dreaded, from a fear of its occasioning a waste of the nutritive juices, discharging themselves through the wound, to the impoverishment and injury, if not the ruin, of the tree.

The pruning of fruit-trees and the lopping off large branches from forest-trees during the winter season, has also been frequently attended with great hurt and impediment to their health and vegetation; the wounds being exposed to all the rigours of an inclement season, and thereby contracting those diseases which contain the principles of decay. Hence it is, that

such numbers of forest-trees are continually injured in their value for public uses, either by unskilful management or purpose depredation, or by the violence of boisterous winds, when their limbs and branches being torn off, the trees are left in that unprotected state to imbibe the seeds of decay and rottenness, which will in time pervade their very heart, and render them unfit for any of those valuable purposes for which nature, by their frame and texture, appears to have designed them.

It may also be observed, that where branches have been cut off from the body of the tree, even at the distance of two or more feet from the trunk, with a view to prevent injury to the timber, even that method has not been found effectual to save the tree from very material detriment; as the remaining stem of the branch so cut away, dying soon after, becomes a ready conduit for conveying pernicious moisture and disease to that part of the tree with which it is connected; and so on, in time, to the whole.

The practice of others, in lopping their trees close to the trunk, and dressing the part smooth and even, has less objections than the former; nevertheless, even according to this method, the tree is liable to injury. The effort of nature to heal the wounds thus given discovers itself by encircling the wound with a kind of callus, or lip, which, increasing in size, and swelling out from the annual flow of the juices, forms a hollow or cavity of the central part, where the rain or snow is very apt to lodge; and penetrating between the bark and the wood, dried and cracked by a hard frost or warm sun, promotes that fermentation with the natural juices, which is the certain source of disease and decay.

Young, healthful, and vigorous trees, when they have been injured by being wantonly cut through the bark, or from other causes, will sometimes recover themselves, and, to all outward appearance, be restored to their original soundness; but when cut into planks and boards, internal blemishes and faults are discovered in them, which appear to have been occasioned by the early injuries which the tree had received; the texture of the wood not uniting where the wound was originally given; though, from the youthful vigour of nature, the bark has closed, and an external cure been evidently performed.

As a most efficacious remedy to prevent the evils that I have described, with all their destructive consequences, and to restore sound timber where the symptoms of decay are already apparent, I confidently recommend the use of my composition, which, being applied in a proper manner to the wound-

ed or injured part, will infallibly prevent the bleeding of trees, or the oozing of juices through the wounds of limbs or branches that have been cut off in the middle of summer, when they are in their highest vigour, and most rapid flow of vegetation; by which means, any wasteful discharge of the juices is prevented, and they are duly confined to their natural operations of giving nourishment, growth, and fertility, to their respective bodies.

By employing the proposed remedy, trees of all kinds, whether in gardens or orchards, in parks or forests, may with greater safety and advantage be pruned or lopped in the spring, or early in the summer, than in the winter season; as the composition, when properly applied, repels the flow of the juices through the wound, causes a more active vegetation, and assists nature more powerfully in healing the wound at the time the sap is in full vigour, than when it is on the decline, as in autumn and winter.

It is also necessary to remark, that both fruit and forest-trees (particularly those which grow in the shade) are very liable to be affected with disorders proceeding from the growth of liver-wort, and various kinds of moss, that adhere to the outer bark of the tree, and frequently gain a considerable thickness, that not only prevents the natural flow of the juices, but causes a stagnation in the circulation, and brings on decay; which, after destroying the outer bark, penetrates, by degrees, deeper into the wood. Where this circumstance is observed, care should be taken to clear the whole bark of the tree from these growths; and where it is infected, to scrape or pare it away. When the body of the tree is thus cleansed from infection, the composition should be applied in a liquid state, to the parts so cleaned, to close the pores of the wood; when the tree will soon acquire a fresh bark, with improved health and vegetation. I am confirmed in these opinions by the many experiments and various trials that I have made to ascertain, by the most positive proofs, the properties of this composition, before I ventured to offer it to the public attention. Indeed, every year's experience has increased my conviction of its general utility, when properly applied to the purposes for which it is recommended. To give a more complete illustration of its virtues, and to place the advantages arising from it in a stronger light, I shall beg leave to state a few of the very numerous experiments that I have made on the forest-trees in his Majesty's gardens at Kensington, where the salutary effects of the composition are evident to every attentive observer.

The first trials of its efficacy were made on some very large and antient elms, many of which were in a most decayed state,

having all their upper parts broken, by high winds, from their trunks, which were withal so hollow and decayed, that a small portion alone of the bark remained alive and sound. Of these trees, I cut away, at first, a part only of the rotten stuff, from the hollow of the tree, and then applied the plaster to the place where the operation had been performed, by way of an internal coat of the composition. In a short time, however, the efforts of nature, with a renovated flow of the juices, were clearly discernible in their formation of the new wood, uniting with, and swelling, as it were, from the old, till it became a strong support to that part of the tree where the composition had been applied. I then cut away more of the rotten wood from the inside, applying the plaster in the same manner, with the same good effects, and continued to use the knife in proportion to the acquisition of new wood; so that, from the tops of these decayed and naked trunks, stems have actually grown of above thirty feet in height, in the course of six or seven years from the first application of the composition; an incontrovertible proof of its good effects in restoring decayed vegetation.

Many other elm trees which had received hurts from bruises and other causes, and where disease and decay were already evident, after cutting away all the infected part, and duly applying the plaster, were so completely healed, that the outline of the wound is scarcely discernible on the bark, and the new wood is as perfectly united to the old, as if it had been originally formed with the tree.

Of oak-trees also, which had received very considerable damage from various accidents, as blows, bruises, and cutting of deep letters, the rubbing off the bark by the ends of rollers, or wheels of carts, and mutilated branches, a perfect cure has been made and sound timber produced. The acidity, or corrosive quality, of the juice of oak-trees, when obstructed in their circulation from any of the causes already mentioned, and fermenting with the wet and moisture imbibed by the wounds from the atmosphere, will bring on disease, and promote decay; for, notwithstanding the hard texture of the oak, when once the principles of decay begin to operate, the acrimonious juices feed the disease, and accelerate its progress, as much, perhaps, as in trees of a softer quality and texture; but when the diseased or injured part is entirely cut away to the fresh sound wood, and the composition properly laid on, as perfect a cure has been made as I have already related in the recovery of the elm trees. Indeed, when I reflect that the oak has been the boast of our early ancestors, and the means, under the blessing of God, of affording protection and safety, as

well as accumulating honour and wealth, to the nation, what language can sufficiently deplore that want of public spirit, and that strange inattention to the preservation and increase of this staple tree, which suffers such numbers of stately oaks to go to decay; in which disgraceful state they remain to upbraid their possessors, as foes to the commerce and naval glory of the kingdom!

Various experiments have also been made on other forest-trees, as ash, limes, chesnuts, and sycamores, that had received the several injuries to which they are exposed; as well as many of the resinous kinds, such as the cedar of Lebanon, and others of the pine tribe; in all of which I have experienced a degree of success that exceeded my most sanguine expectations.

As I feel a strong solicitude to render my experiments of the most extensive advantage to the community, and in particular to the proprietors of landed estates throughout the kingdom, I beg leave to recommend to their particular attention, that all forest-trees, whether felled with a saw or an axe, may be cut near to the ground; at the same time carefully preserving the stump and roots from any further injury. The surface should then be made quite smooth when the composition may be spread over the whole surface according to the directions already given. It should, however, be observed, that the composition, when employed for this particular purpose, should have an equal quantity of the powder of alabaster mixed with the dry powder generally directed to be used after the composition is laid on, in order to render the surface harder, and of course better able to resist the bad effects of the dripping of trees, of rain, frost, and snow. But this addition is by no means necessary in the usual application to the sides of trees.

In consequence of this process, the vigour of the roots will operate so powerfully in the course of the succeeding spring, that a considerable number of buds or branches will shoot forth round the stump, which, with proper care and attention, may be trained to many valuable purposes, either straight or crooked, for knee-timber, or other uses; and, by retaining only so many of these shoots as are designed to grow for any particular intention, more than one half will be saved, in point of time, according to the proportions of common growth: For if a young tree be planted in a soil equal in quality to the site of the old stump, the shoot growing from the latter will, in eight or ten years, attain to a size which the single plant will hardly acquire in twice that period. There are also many useful purposes of husbandry, as hop-poles, and other poles used on various occasions, for which a number of shoots may be trained

from one stump, whose fertile juices will shortly rear a healthy and numerous offspring around it. Very particular attention, however, should be paid to regulate their number, according to the size and vigour of the stump. It would certainly be proper to leave more of them at first than are intended to be reserved for final use, in order to draw up the sap; if too few are left they will be liable to burst, from the superabundant flow of the juices from the old stock: To prevent which inconvenience, they should be cut away by degrees, always applying the composition as they are cut, and leaving the finest stem to produce the new tree, which will, in time, cover the old stump, and leave nothing but a faint kind of cicatrix at the junction of the old and new part of the tree.

It is needless for me to insist on the great advantages which land-proprietors and farmers will derive from this method of managing their woods and coppice grounds, wherever they may be. In many counties of England, coppice, or underwood, is an article in very great demand for charcoal, common fuel, or the purposes of particular manufactories, as well as to furnish a variety of articles for husbandry and domestic convenience.

It would be equally unnecessary to enlarge on what must be so evident to the most ordinary understanding, the great national advantage which may be derived from the use of this composition, by preserving and increasing the native supplies of our country for the support of that navy which is to protect it. Nor need I urge to the man of taste, and the lover of landscape beauty, what a useful help it may afford to the delightful modern art of ornamental horticulture.

APPENDIX.

APPENDIX.

No. 1.

Land Revenue Office, April 17, 1789.

SIR,

BEING informed that you have discovered a method of curing defects in growing trees of all ages, which may have sustained damage from any cause whatever, we wish to be favoured by you with an answer to the following questions, relative to injuries done to the bark of oak-trees, and the means of preventing defects in the timber arising from that cause, viz.

1. Supposing a piece of bark of five or six inches square to be cut from the side of an oak-tree of any size, from twenty feet to one load or more, so as to lay the wood bare, and that letters or figures were burnt or stamped with sharp instruments, into solid wood, where the bark was so taken off, and the tree left in that state so long as it should continue standing, what effect do you think would be produced by such process upon the body of the tree; whether it would continue to grow, and increase in size in the part from which the bark was taken; or whether any, and what detriment would ensue from it to the timber, if no means were used to prevent it; and whether such detriment, if any, would extend further than the limits of the part deprived of its bark?

2. If you should be of opinion that oak-trees would sustain any material detriment, or become in any degree defective, from the cause above stated, do you know any means by which such detriment may be effectually prevented, in trees which have remained in that state from four, five or six months to a year; so as to restore the bark, and prevent the trees from becoming defective, and unfit for the use of the navy?

3. If you should be able to suggest a complete remedy for such defects, and if the remedy would be effected by means peculiar to yourself, and unknown to others, we wish to know

if you would be willing to undertake to apply it, or superintend or direct the application of it by persons properly instructed by yourself, to any number of trees that might require it in any of the royal forests?

4. In case there should be occasion to apply such a remedy to a very considerable number of trees in the state above described, we wish to know, as nearly as possible, what expence the application would be attended with, by the hundred, or thousand, or any given number of trees, including labour, materials, and every incidental expence?

We shall be glad to receive an answer to these enquiries with all convenient speed, and are,

Sir,

Your most obedient Servants,

JOHN CALL,
JOHN FORDYCE.

Mr. Forsyth.

No. 2.

To the Honourable the Commissioners of the Land Revenue.

Royal Gardens, Kensington, April 24, 1789.

HONOURED SIRS,

TO the letter you have been pleased to honour me with, I beg in general to say, that, from many years attention to fruit and forest-trees, I have observed every wound, bruise, or injury; even the wanton cutting of the initials of a name on the bark of a tree has been attended with mischief, and has often brought on the destruction of the tree, especially if old. In particular I beg to say, that if a tree be young, nature will exert herself to recover from the injury; but if the tree be old, it will cease to grow about the injured part, will not increase in size, the wound will daily increase, and in time destroy all the timber of the tree.

In answer to the second question, I beg to say, that oak-trees are equally liable to decay and detriment, as all other trees, though their decay will be proportionably slow, as they are less porous than many other trees of our island; though I should add, that after oak-trees are so far decayed as to hold water, their decay is as rapid as most other trees. In answer to the question, "Do you know any means by which such detriment may be effectually prevented?" I beg to say, that after many years close application, and strictly critical observation, I am fully convinced, that upon the excision of the decayed part, and the application of a composition, it is possible to heal any wounded tree, and even to restore it to its former health, if there be only an inch or two of bark remaining to carry on the circulation of the vegetable economy. This is no theory, but is demonstrated by a great variety of experiments on fruit and forest trees in his Majesty's gardens at Kensington, now under my care; and which trees, upon examination, have convinced all those who viewed them of the practicability of producing the finest, cleanest, and most prolific branches from stumps in a state of decay: And with confidence I can assert, that I have succeeded so well with his Majesty's fruit-trees, that by cutting out the diseased and dead wood, the trees have produced more and finer fruit in two and three years, than a tree newly planted will in thirteen or fourteen years; and this advantageous circumstance is equally visible in the experiments I have made on elms, where nothing remained but the bark. The oak, from experience, I find equally as curable as any other tree; the bark may be restored, and the trees rendered as fit for the navy, as though they never had been injured.

In answer to the third question, I say, that I am able to "suggest a complete remedy for the defects;" and that remedy I suppose to be known only to myself, as it is not a secret drawn from books, or learned from men, but the effect of close application, and repeated experiments. As to undertaking the application of the remedy, I must request you will have the goodness to permit me to say, that as a servant of his Majesty I do not think myself at liberty to form any engagement that must inevitably call me for a time from his Majesty's service in his royal gardens at Kensington; but should his Majesty be graciously pleased to think my services would be productive of a national good, and will condescend to permit me to be absent, I shall with the greatest pleasure and alacrity engage in the undertaking.

I beg permission to lay before your Honourable Board several specimens of parts of trees which have been injured in a manner similar to those you have alluded to; others which have been healed by the method I have before mentioned. But the most effectual means of demonstrating the utility of this application, is the many fruit and forest-trees now growing in his Majesty's royal gardens at Kensington, which I shall be happy to shew you.

Your Honourable Board, considering the shortness of time, will, I trust, make every allowance for any inaccuracy in this answer to the letter you favoured me with, and permit me to subscribe myself.

With the greatest respect,
Your most obedient
Humble Servant,
WILLIAM FORSYTH.

To the Honourable the
Commissioners of the Land Revenue.

Land Revenue Office, April 25, 1789.

SIR,

WE have received your letter of yesterday's date, which contains a very clear and satisfactory answer to our enquiries respecting the effects of injuries done to the bark of oak-trees, and the means of preventing damage to the timber from that cause; and the specimens sent with your letter afford the most convincing proofs both of the destructive consequences arising from even slight injuries to the bark, when no means are used to prevent them, and of the efficacy of your discovery for preventing and curing defects in timber proceeding from that source; but we observe that you have not given an answer to our enquiry as to the expence which the application of the remedy you have discovered would be attended with, by the hundred, or thousand, or any given number of trees, in case there should be occasion to apply it to a very considerable number: We therefore repeat our request, that you will be

so good as to inform us, as nearly as you can, whereabouts would be the expence of such application, including labour, materials, and all incidental charges, but exclusive of any reward to yourself for disclosing the composition for the benefit of the public, which we conceive should be given separately.

We are, Sir,

Your most obedient Servants,

JOHN CALL,
JOHN FORDYCE.

Mr. William Forsyth.

No. 3.

To the Honourable the Commissioners of the Land Revenue.

Royal Gardens, Kensington, April 28, 1789.

HONOURED SIRS,

I PRESUME I need not again assign the reason why I omitted in my former letter, mentioning the expence which will be incurred by cutting out the injured parts of the trees, and the application of my composition. I have endeavoured to think of every probable charge that will accrue; and, upon an accurate calculation, am convinced it will not exceed sixpence per tree. It may not be improper here to observe, that this calculation includes the labour of the men for the operation; the composition, and the application of it; and also an after review, that the healing of the trees is going on well; but I should also observe, that in this expence I have not put down any thing for myself, leaving that wholly and altogether to your further consideration.

I am, honoured Sirs,

With great respect,

Your most obedient,

Humble Servant,

WILLIAM FORSYTH.

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No. 4.

July 24, 1789.

RESOLVED,

THAT an humble address be presented to his Majesty, that he will be graciously pleased to give directions for making such enquiries as shall be thought necessary for the purpose of ascertaining the efficacy of a remedy invented by William Forsyth, for curing defects in trees, arising from injuries in the bark; and in case the same shall appear likely to be of public utility, to order such recompence to be made to the said William Forsyth on the disclosure thereof, as his Majesty shall judge proper; and to assure his Majesty, that this house will make good the same.

No. 5.

Land Revenue Office, Scotland Yard, Dec. 11, 1790.

MY LORDS AND GENTLEMEN,

HAVING represented to the Lords Commissioners of his Majesty's Treasury, that, in pursuance of their Lordships desire, we had written to the several noblemen and gentlemen mentioned in the list, of which a copy was sent to each of you, requesting to know whether they would have the goodness to make the necessary examinations and enquiries, to ascertain the effect of the experiments made by Mr. Forsyth, of the composition discovered by him for curing defects in trees; and that twelve of those noblemen and gentlemen, here under named, and to whom this letter is addressed, had signified their willingness to assist in the proposed examination; we have now the honour to inform you, that their lordships have been pleased to signify to us, that they approve of their examination being made by those noblemen and gentlemen, or any

seven or more of them; and to request that you will be pleased to take such steps as you shall think necessary, for ascertaining the efficacy of the said composition for curing injuries and defects in trees, and to address the result of your examination to the lords of the treasury.

Among the uses to which the composition in question is said to be applicable, that which appears to us more immediately connected with the objects referred by parliament to our consideration, is, the cure of injuries and defects in forest-trees, especially the oak: And we beg leave particularly to recommend it to you to examine,

Whether the composition appears to be efficacious for the purpose of restoring the bark of an oak-tree which has been either cut or accidentally torn off, so as to prevent such injuries or defects in the timber as are commonly found to proceed from that cause;

And whether the application of the composition to the parts of forest-trees where limbs or branches have been cut or torn off, appears to be efficacious for the preventing or curing injuries and defects in timber, proceeding from that cause?

We presume, with great difference, that you will think it proper to point out any other uses to which the composition may appear to you to be applicable, with advantage to the public; and we request that you will be pleased to favour us with a copy of your resolutions, or report to the treasury thereon.

We have the honour to be,

My Lords and Gentlemen,

Your most obedient humble Servants,

CHARLES MIDDLETON,
JOHN CALL,
JOHN FORDYCE.

The Marquis of Abercorn.
Earl of Upper Ossory.
Lord Viscount Barrington.
Lord Frederick Campbell.
Sir George Yonge, Bart. K. B.
John Rolle, Esq.
Philip Stephens, Esq.
C. M. Pierrepont, Esq.
William Pulteney, Esq.
Robert Barclay, Esq.
Hans Sloane, Esq.
William Mainwaring, Esq.

.....

To the Lords Commissioners of his Majesty's Treasury.

MY LORDS,

HAVING met on Saturday, at Kensington, in compliance with the desires of your Lordships, communicated to us by the Commissioners of the Land Revenue, we endeavoured to take every measure for the investigation requested of us that the time and circumstances permitted; and we conceive that the best and most satisfactory mode of reporting to your lordships the result of that investigation will be, to specify, as shortly as may be, the steps we took; the observations we made; and our opinions, founded both upon what we ourselves saw, and upon such documents as appeared to us authentic and convincing.

After referring to the last letter addressed to us by the Commissioners, in order that we might keep in view, as much as possible, the objects more particularly recommended to our attention, we proceeded first to read a statement by Mr. Forsyth of the properties of his composition, and then to inspect and examine the various specimens and documents laid before us by him, tending to prove and illustrate those properties.

Our investigation, thus far, having proved as satisfactory as the nature of it admitted, we thought it right to require Mr. Forsyth to shew us such trees in Kensington Gardens as (having been injured or decayed by whatever cause) had been benefited by the application of this composition; and we desired him to shew us what specimens he could of such trees in all the stages of their amendment and recovery. In consequence of this requisition, we were conducted to many forest-trees of different kinds, viz. elms, limes, and horse-chesnuts in which holes and wounds, in some instances several feet in length, and of a considerable width and depth, had been completely filled up with sound wood, so as the outline of the wound remained barely discernible in the bark. We examined many others in an evident state of progress towards a similar cure, and we could not discover any one of the experiments that fell under our observation, of which we had the least reason to doubt the success. We examined also several experiments upon trees which standing near each other, had been cut down, and to the stems of which the composition had been applied, while the

others had been left to nature: The uniform result of these experiments appeared, that those stems to which the composition had been applied had shot up into healthy vigourous trees, in far less time than we should have conceived possible: While those, left to unassisted nature, had only produced irregular, unhealthy shoots, and were apparently in a state of decay. Several experiments had also been made on decayed and hollow stumps (where little or nothing but bark remained) of elms of very considerable size and age: From these stumps, by the application of the composition, healthy trees have issued, which have, in the space of five, six, seven, or eight years, attained to a size and height which it appears to us that trees sown or planted seldom attain to in thrice the time. With a view to ascertain, as far as was in my power, the quality of that wood which by the application of the composition had been formed in the decayed and injured parts of trees, we cut pieces of it out, and compared them with other pieces cut out of the original wood of the same trees, and, after as accurate a secreting and comparison as we were enabled to make, we could not discover any difference either in the colour or texture.

Upon our observing to Mr. Forsyth, that we had not yet seen any specimens of the operations of his composition upon oak-trees, he informed us, that having at first confined his experiments to other trees, which were in a state of greater decay, he had none of the same date (viz. from two to eight years) to shew us, but that we might see many specimens, of near two years standing, equal in their progress to the rest: Accordingly, we examined various experiments upon oaks; of which the progressive state was so perfectly similar to that of the other species of trees, that we should not be justified in any doubt upon that head; the event, also, of comparing the new wood with the old was the same.

To report at large our observations upon the effects of the composition applied to the different fruit-trees, would be little more than a repetition of what we have already said; the time of the year would only allow us to remark the rapid growth of the branches and shoots wherever the composition had been applied to the most decayed and injured stems.

We deem it unnecessary to enter into any detail of the collateral information and documents which confirmed the impressions resulting from our personal observations, persuaded that your lordships will believe we omitted no means in our power to form our judgments.

We will therefore only add, that, from all we saw and heard, we have reason to believe, and consequently do not hesi-

tate to express our conviction, that Mr. Forsyth's composition is a discovery which may be highly beneficial both to individuals and the public.

We have the honour to be

Your Lordships obedient Servants,

ABERCORN,
FREDERICK CAMPBELL,
WILLIAM PULTENEY,
CHARLES PIERREPONT,
HANS SLOANE,
GEORGE YONGE,
PHILIP STEPHENS,
ROBERT BARCLAY,
JOHN ROLLE,
WILLIAM MAINWARING.

No. 6.

IN consequence of an address of the House of Commons to his Majesty, and of an examination made by

The Marquis of Abercorn,
Lord Frederick Campbell,
William Pulteney, *Esq.*
Charles Pierrepont, *Esq.*
Hans Sloane, *Esq.*
Sir George Yonge, *Bart.*
Philip Stephens, *Esq.*
Robert Barclay, *Esq.*
John Rolle, *Esq. and*
William Mainwaring, *Esq.*

and their report to the Lords Commissioners of his Majesty's Treasury, respecting the efficacy of a composition discovered by Mr. William Forsyth, for curing injuries and defects in trees, his Majesty has been pleased to grant a reward to Mr. Forsyth, for disclosing the method of making and using that composition; and the following directions for that purpose are published accordingly:

.....

Royal Gardens, Kensington, May, 11, 1791.

Directions for making a Composition for curing Diseases, Defects, and Injuries, in all kinds of Fruit and Forest-Trees, and the Method of preparing the Trees and laying on the Composition, by WILLIAM FORSYTH.

TAKE one bushel of fresh cow dung, half a bushel of lime rubbish of old buildings (that from the ceilings of rooms is preferable), half a bushel of wood ashes, and a sixteenth part of a bushel of pit or river sand: The three last articles are to be sifted fine before they are mixed; then work them well together with a spade, and afterwards with a wooden beater, until the stuff is very smooth, like fine plaster used for the ceilings of rooms.

The composition being thus made, care must be taken to prepare the tree properly for its application, by cutting away all the dead, decayed, and injured part, till you come to the fresh sound wood, leaving the surface of the wood, very smooth, and rounding off the edges of the bark with a draw-knife, or other instrument, perfectly smooth, which must be particularly attended to; then lay on the plaster about one eighth of an inch thick, all over the part where the wood or bark has been so cut away, finishing off the edges as thin as possible: Then take a quantity of dry powder of wood ashes mixed with a sixth part of the same quantity of the ashes of burnt bones; put it into a tin box, with holes in the top, and shake the powder on the surface of the plaster, till the whole is covered over with it, letting it remain for half an hour, to absorb the moisture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder till the whole plaster becomes a dry smooth surface.

All trees cut down near the ground should have the surface made quite smooth, rounding it off in a small degree, as before mentioned; and the dry powder directed to be used afterwards should have an equal quantity of powder of alabaster mixed with it, in order the better to resist the dripping of trees and heavy rains.

If any of the composition be left for a future occasion, it should be kept in a tub, or other vessel, and urine of any kind

poured on it, so as to cover the surface; otherwise the atmosphere will greatly hurt the efficacy of the application.

Where lime rubbish of old buildings cannot be easily got, take pounded chalk, or common lime, after having been slaked a month at least,

As the growth of the tree will gradually affect the plaster, by raising up its edges next the bark, care should be taken, where that happens, to rub it over with the finger when occasion may require (which is best done when moistened by rain), that the plaster may be kept whole, to prevent the air and wet from penetrating into the wound.

WILLIAM FORSYTH.

William Forsyth, of Kensington, in the county of Middlesex, gardener, maketh oath, and saith, that the foregoing is a true account of the method of making and using the composition discovered by him for curing diseases, defects, and injuries, in fruit and forest-trees: and which composition was applied by him to the trees in his Majesty's gardens at Kensington, shewn to the noblemen and gentlemen to whom it was referred to examine the efficacy of the said composition.

WILLIAM FORSYTH.

Sworn at the Land Revenue Office in Scotland Yard, the eleventh day of May, 1791, before us,

CHARLES MIDDLETON,
JOHN CALL,
JOHN FORDYCE.

.....

No. 7.

Additional Directions for making and using the Composition.

TO the foregoing directions for making and applying the composition, it is necessary to add the following.

As the best way of using the composition is found, by experience, to be in a liquid state; it must, therefore, be reduced to the consistence of pretty thick paint, by mixing it up with a sufficient quantity of urine and soap-suds, and laid on with a painter's brush. The powder of wood-ashes and burnt bones is to be applied as before directed, patting it down with the hand.

When trees are become hollow, you must scoop out all the rotten, loose, and dead parts of the trunk till you come to the solid wood, leaving the surface smooth; then cover the hollow, and every part where the canker has been cut out, or branches lopped off, with the composition; and, as the edges grow, take care not to let the new wood come in contact with the dead, part of which it may be sometimes necessary to leave; but cut out the old dead wood as the new advances, keeping a hollow between them, to allow the new wood room to extend itself, and thereby fill up the cavity, which it will do in time, so as to make as it were a new tree. If the cavity be large, you may cut away as much at one operation as will be sufficient for three years. But in this you are to be guided by the size of the wound, and other circumstances. When the new wood, advancing from both sides of the wound, has almost met, cut off the bark from both the edges, that the solid wood may join, which, if properly managed, it will do, leaving only a slight seam in the bark. If the tree be very much decayed, do not cut away all the dead wood at once, which would weaken the tree too much, if a standard, and endanger its being blown down by the wind. It will, therefore, be necessary to leave part of the dead wood, at first to strengthen the tree, and to cut it out by degrees as the new wood is formed. If there be any canker, or gum oozing, the infected parts must be pared off, or cut out with a proper instrument. When the stem is very much decayed, and hollow, it will be necessary to open the ground and examine the roots; then proceed as directed for hollow peach-trees; [*See Plates* 2 and 5, which

shew the manner of preparing hollow trees, and also the growing of the wood.]

Some months before the publication of the "Observations on the Diseases, &c. in Fruit and Forest-Trees," I had tried the composition in a liquid state, but did not think myself warranted to make it public until I had experienced its effects through the winter. The success answered my most sanguine expectations; and I have used it in that way ever since. By using the composition in a liquid state, more than three-fourths of the time and labour is saved; and I find it is not so liable to be thrown off as the lips grow, as when laid on in the consistence of plaster: It adheres firmly to the naked part of the wound, and yet easily gives way as the new wood and bark advances.

The first time that I tried the composition in a liquid form was upon an elm which had been planted about twenty years. It had been very much bruised by the roller, had several cavities in it, and was very much bark-bound besides. Having prepared the wounds, and applied the composition with a painter's brush, I took my knife and scarified the tree in four places; I also shaved off, with a draw knife, all the cankery outer bark, and covered the whole tree with the composition, shaking the powder of wood-ashes and burnt bones all over it. A very heavy rain began in the evening and continued all night; yet, to my great surprize, in the morning, I found that only some of the powder, which had not had time to dry and incorporate with the composition, was washed off. I now repeated the powder, and, without any thing more being done to the tree, the wounds healed up and the bark was restored so completely, that, three years ago, it could hardly be discerned where the wounds had been. The scarifications had also disappeared. Some of the wounds were thirteen inches long, eight broad, and three deep. Since the time when it was scarified, the tree has increased ten inches more in circumference than a healthy tree planted at the same time with it about sixteen feet distant, which was not scarified.

SUPPLEMENT.

SUPPLEMENT.

Success of several Experiments, since the Publication of "Observations on the Diseases, Defects, &c."

SINCE I published my "Observations on the Diseases, Defects, and Injuries in Fruit and Forest-Trees," I have been assiduous in making experiments for the sake of improvement. A great many hollow trees that had, when I took them in hand, little more than the bark remaining sound, have within these few years been entirely filled up: Others, that were headed down within a few feet of the ground, have their stumps now completely covered by the leading shoot, forming handsome trees; and the places where they were headed are only discerned by a faint cicatrix. Of a great many, I shall only particularize a few instances.

A lime-tree, about eighteen inches in diameter, whose trunk was decayed and hollow from top to bottom, to which, after cutting out the decayed wood, I had applied the composition about sixteen years ago, was cut down last year on purpose to examine the progress it had made in the interior part, and was found entirely filled up with new sound wood, which had completely incorporated with what little old wood remained when I first took it in hand. The body of this tree I had cut in short lengths, which I have now in my possession, to shew to any gentleman who wishes to be convinced of the fact. An old elm whose inside was totally decayed, and out of which, at different times, were taken two large cart loads of rotten wood, has made shoots upwards of twenty feet high in the course of six years. Another elm, on the Palace Green, which was headed about twenty feet from the ground, has produced a shoot forty-six feet high, and five feet nine inches in circumference. A lime, cut down near the ground, has now a shoot twenty feet high which entirely covers the stump, forming a fine tree twenty-one inches in circumference. A Sycamore treated in the same manner is now thirty feet high, and twenty-six inches in circumference. Another is thirty feet high, and

two feet in circumference. These are now fine thriving trees, and the cicatrices hardly discernible.

A Horse-Chesnut headed down has produced, from its hollow stump, four fine shoots, one of which is cut down; the other three are upwards of thirty feet high, and one of them is twenty-six inches in circumference. Two of the remaining three are to be cut down, leaving only one to form the body of the tree. A lime, whose hollow part is eleven feet high, is also filling up; the tree is a foot in diameter. A decayed part, four feet high and twenty eight inches broad in a large elm, is now filling up rapidly with sound wood. About two feet and a half in length on one side, which was for some time left to nature, still continued to decay till the composition was applied: New wood and bark are now forming. An elm, at the back of the old fruit-room, near the garden wall, which was entirely hollow, was also headed down: The new head now spreads about twenty-four feet, and is eighteen feet high. Another large hollow elm near the last was headed down; it afterwards produced a shoot sixty feet high, and three feet and a half in circumference; the hollow was upwards of two feet in diameter. There are a great many other elms, some of which had wounds ten feet long and two feet broad, now entirely filled up; besides many sycamores, oaks, and other forest-trees, all restored to a flourishing state, by having the dead wood cut out and the composition applied. An oak that was headed down about six years ago is represented in plate 12.

In hollow trees, the rotten and decayed wood must be cut out at different times, as the new wood comes in contact with it; but great care must be taken not to cut out too much at once, but to leave enough to support the tree and prevent it from being blown down by high winds, till the new is strong enough for that purpose: The remainder may then be cut out.

A number of instances of the success attending my method of pruning and training might be adduced; but I shall notice only the following.

Mr. Aberdeen, gardener to John Sullivan, Esq. at Richings near Windsor, has followed it for some time with great success both in the house and on the natural wall.

Having heard for several years of the very fine and large crops that were produced in the forcing houses belonging to John Julius Angerstein, Esq. at Woodland House, on Blackheath, I was induced to take a journey thither, in company with John Wedgwood, Esq. to see what method was pursued to obtain such crops. On enquiry, Mr. Stuart, the gardener, candidly told me, that several years ago he had been at Ken-

sington Gardens, where he saw my method of pruning and training, was convinced of its advantages above the old, and had adopted it with great success. Indeed, there were, at the time I was there, the finest and largest crops of grapes that I had ever seen in any forcing houses. Two houses, in particular, were covered from top to bottom with fine grapes, and the vines trained in the serpentine manner.

John Wedgwood, Esq. of Cote House near Bristol, a gentleman who is much attached to gardening and planting, tells me, that he has practised my mode of pruning and training fruit-trees, particularly peaches and nectarines, in his houses; and that he is highly pleased with the method, which has been attended with great success.

Lord Frederick Campbell has lately favoured me with a list of eighty-five fruit-trees, of different kinds, that were headed down, in his gardens at Coomb Bank in Kent, in the years 1798 and 1799; and afterwards trained and pruned according to my method; many of them before heading down, were in a very cankery, unfruitful state, and overgrown with moss: These are now in a fruitful, healthy, and flourishing condition, some of the espaliers have made shoots from two to three yards long, and upwards. These trees were cut and prepared by Mr. Williams, who had been for some time accustomed to my way of treating such trees, and whom I recommended to his Lordship as a gardener. These trees are very proper patterns for any gentlemen in the neighbourhood, who wish to give the composition, and method of training and pruning, recommended in this treatise, a fair trial.

Several successful trials have also been made at the Duke of Dorset's seat, at Knowle in Kent, at Hatfield House, the seat of the Marquis of Salisbury, and at a great many other places; and experiments are now making at Sir Henry Strachey's at Rook's Nest, near Godstone, in Surrey.

Although I do not mean to enter at large on the culture and management of forest-trees; yet as the following observations on raising oaks, and directions for planting chesnuts for underwood, may be of considerable service, I shall, without any farther apology, lay them before my readers.

The best Way of raising Oaks.

It is a generally received opinion, that when an oak loses its tap-root in transplanting, it never produces another; but this I have proved to be a mistake, by an experiment which I made on a bed of oak plants in the year 1789. I transplanted them into a fresh bed in the forementioned year, cutting the

tap-roots near to some of the small side-roots or fibres shooting from them. In the second year after, I headed one half of the plants down, as directed for chesnuts, and left the other half to nature. In the first season, those headed down made shoots six feet long and upwards, and completely covered the tops of the old stems, leaving only a faint cicatrix, and had produced new tap-roots upwards of two feet and a half long. One of these trees I left at the Land Revenue Office, for the inspection of the commissioners, and to shew the advantage of transplanting and heading down young oaks, when done in a proper manner. By this mode of treatment they grow more in one year than in six when raised in the common way. The other half of the plants, that were not headed down, are not one fourth the size of the others. One of the former is now eighteen feet high, and, at six inches from the ground, measures fifteen inches in circumference; at three feet from the ground, ten inches; and at six feet, nine inches and a half; while one of the largest of the latter measures only five feet and a half high, and three inches and three quarters in circumference, at six inches from the ground. This is a convincing proof, that transplanting and heading down oaks is the most successful and advantageous way of treating them; and by it they are sooner out of danger from cattle, as well as from vermin, which are frequently very injurious to young trees.

Of raising Chesnuts for Underwood.

As the chesnut is the best and most durable wood for stakes, hop-poles, &c. I shall give some directions how to plant them to the best advantage for copse wood.

For this purpose, the ground should be trenched or ploughed, and well summer-fallowed. After the fall of the leaf, plant the young trees in the quincunx order, in rows six feet apart, and at the distance of six feet in the rows from plant to plant. If you are forming large plantations, the most expeditious way will be to plant after the plough, treading the earth firmly about the roots of the plants. It will be necessary to form basons round the plants on purpose to mulch them, if it should happen to be a dry season the first summer after planting. It may, perhaps, be a saving of time to put the plants in loosely at first, that you may be able to keep up with the plough, and to return afterwards to tread the mould, and form the basons for mulching.

When the trees are become fit for poles, every other one may be cut down almost close to the ground, throughout the plantation; always observing to cut in a sloping manner, and

as near to an eye as may be. Those that you intend for timber should be left in every other row, which will leave them twelve feet apart every way; but if the soil be rich and deep, it may be necessary to leave them twenty-four feet apart. In many counties, particularly Hertfordshire, the underwood is more valuable than timber; in that case it will be more judicious to leave but few trees for that purpose: In the mean time the underwood will amply repay you for the expence of planting, &c. besides the rent of the ground, while at the same time you have a sufficient crop of timber on the ground. In Kent, they generally plant out chesnuts and ash for hop-poles at three years old, and cut them fourteen years after, which makes in all, seventeen years before they are fit to cut; and they bring from one guinea and a half to two guineas per hundred; but if they were raised from large stools, properly cut and the composition applied, they would be fit for cutting in less than one third of that time, and of course, the value of the land would be tripled.

.....

LETTERS

ON THE

Effect of the Composition in all Climates.

THE following letters, &c. are inserted to shew that the composition, when properly applied, is found to be equally efficacious in all climates, soils, and situations. Indeed, all who have given it a fair trial are so fully convinced of its utility, that many noblemen and gentlemen have sent their gardeners to me for instructions. The Chevalier D'Almeida, the Portuguese Ambassador, had a person sent from Portugal for the same purpose; and some Polish noblemen, who had seen the trees in Kensington Gardens, were so fully convinced of the great advantage to be deprived from the application of the composition, as to send a man for instructions, that he might introduce the practice into Poland.

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Copy of a Letter from the Economical Society of St. Petersburg.

Imperial Corps of Land Cadets, in St. Petersburg,
January 9, 1792.

SIR,

AS a Member of the Economical Society of St. Petersburg, his Excellency Count Anhalt solicits me to express, in your own language, the pleasure which the communication of your useful discovery has given him, and the learned body over whom he so worthily presides. The Count has already taken the necessary steps, by desire of the Society, to have your little dissertation translated and printed in the Russian language, in order to diffuse the advantage it holds out, as widely as possible, over this vast empire. I am happy in the

opportunity his commission offers, of expressing likewise individually the satisfaction I have received, as a countryman and lover of Botany, from the perusal of your sagacious application of the Chirurgical art to vegetation; and must own, that your extirpation of the diseased parts, and the use of an unguent to ward off the noxious action of the air and humidity, during the exertions of nature to repair loss of substance, and the languid circulation of the vegetable juices, appear to me highly judicious. The analogy in certain respects between the inferior order of *beings*, so particularly your care, and the more animated link of the great chain of Creation, seems to become every day more and more apparent. Nay, if we are to credit the ingenious author of the Philosophy of Natural History, lately published in Edinburgh, it is not a little evident; and indeed the great number of curious facts and observations which he has brought together render his phrase, which I have used above, much less improper than it would have otherwise appeared on the face of the case. All these considerations then make me see, with the more pleasure, the sagacious application of at least one branch of the healing art to ascertain diseases of vegetables, to the advantage of the world in general, and the British Navy in particular, which must gain infinitely by the preservation and health of British Oak, unrivalled for the noble purpose to which it is applied.

I have still to congratulate you on your becoming, so deservedly, a member of our Society; for sure no treatise ever laid before us promised a wider field of public and private economy, and of course none ever came more immediately under the spirit and purport of our institution.

I am, Sir, with hearty wishes for the success and extended range of your pursuit.

Your most obedient, humble Servant,

(Signed) MATTHEW GUTHRIE.

To Mr. Forsyth, Kensington.

PS. As the extremes of our climate may produce cases which are not likely to happen in your temperate island, Count Anhalt will be happy to see more observations on such accidents in any future letter you may address to the Society. A paper of mine on the Russian Climate, in the second volume of the Philosophical Transactions of the Royal Society of Edinburgh, may probably afford you all the information necessary to judge of what modification your system may require in this country, although I do think it applicable every where, with

possibly some little alteration in the consistence of your plaster, to suit extremes of heat and cold. This letter being of a public nature, intended to testify the sense of the Economical Society of Petersburg, on your useful discovery, you may make what use of it you please.

Copy of a Letter from George Sulivan Marten, Esq.

Enston, Oxfordshire, July 30, 1800.

SIR,

UNDERSTANDING there exists some doubt how far your vegetable plaster answers in hot climates, I cannot in justice hesitate to inform you, that it was in constant and successful use not only in my own garden in the district of Trinsivelly, four hundred miles South of Madras, but also in the Company's Cinnamon Plantation which I had the pleasure of forming there, and where, from the method of cultivating that spice, the trees are always cut down to stumps. Your plaster at these times was always applied, which stopped the bleeding, and hastened out the shoots (from whence the best cinnamon is taken) much quicker than the former mode (and which is still practised in Ceylon I believe) of heaping the earth over them. Nor was my experience confined; for, when I quitted India in October 1798, I left one hundred and fifty thousand trees and plants in the Trinsivelly Plantations, all of which I had planted from the seed of two trees brought from the island of Ceylon by Mrs. Light, which are yet flourishing, I dare say, in the Commercial Resident's garden.

I likewise applied your plaster with equal success to the fruit-trees of the country. But to an old Pumbilmos, or Shaddock tree, which was almost throughout decayed, and which I had to fill up with the plaster after the dead wood was taken out, it produced wonderful renovation. I derived too much benefit from this composition to finish without assuring you, that I will with much pleasure give you any further information as to its success in hot countries that came within my observation during the use of it for several years in the district of Trinsivelly.

I am, Sir,

Your most obedient Servant,

(Signed) GEORGE SULIVAN MARTEN.

To Mr Forsyth.

.....

Copy of a Letter from John Wedgwood, Esq.

Cote House, Nov. 14, 1800.

DEAR SIR,

WHEN you were with me you expressed a wish to have the number of peach and nectarine trees which I had on my walls that had been dressed with your composition. These trees were part of a set which I bought in a lot, and which had been left to grow rude against an old wall, so that they appeared to be gone past all cure. Many were eaten up with the canker, and many were become so naked at the bottom that they gave but little room to imagine they could be brought into any form. I planted them against my walls in the beginning of the year, where they were left unpruned till the middle of May. The gardener then gave them a severe cutting in, and, as he went on, constantly dressing them with your composition, carefully eradicating all the canker. I can now safely say, that they are as free from canker as any trees I ever saw, and full of fruit-bearing wood, many of them brought into excellent form, and all of them, except some few which died in the summer, promising to make very useful and profitable trees; so that if I had occasion to new stock my walls, I should as willingly purchase another such lot as to buy regular trained trees from a nursery. Provided the roots are good, I am convinced from experience, that the older the tree the more profitable it will be, as in the case of the trees above described; all the young shoots are covered with blossom buds in great profusion.

The following is the list of the trees, and the aspects of the walls on which they are planted,

19	Peach and Nectarine Trees	on a new wall by the hot-house, East aspect.
16	do. . . do.	on another, East aspect.
19	do. . . do.	on the same aspect.
5	do. . . do.	on a South aspect.
2	do. . . do.	on another South wall.
4	do.	on another South wall.
65	in all.	

These are exclusive of many trees that were on the walls before, and which have been much benefited by being dressed with your composition. I am so fully aware of the excellence of the composition, that I do not permit the gardener to prune any plants without immediately using it. If you think these remarks can be of any service, you have my permission to make any use of them.

I am, dear Sir,

Yours sincerely,

(Signed) JOHN WEDGWOOD.

Extract of a Letter from Thomas Davis, Esq. Author of the Agricultural Survey of Wiltshire.

June 28, 1801.

"I WAS happy in having an opportunity the other day of shewing the effects of your plaster (in recovering the bark of oak-trees of 4 or 500 years old, which had begun to rot upwards from the ground, and is now recovering downwards very rapidly,) to *Lord Spencer*, who was both pleased and astonished with it.

"You may at any time refer to *me* for proofs if you want them. I made a bold experiment seven years ago on an oak-tree 40 feet high and 16½ feet round, worth £.80 at least to a *Carpenter* to cut to pieces, and such a tree as the King has not ten in his dominions. There was a craze in the side of it, which looked like a shake, and spoiled its beauty. I cut out the bark on each side the fissure so as to make the opening 6 or 7 inches wide. I coated it well with plaster, and it is now perfectly united and sound."

.....

Directions for Heading down Orange-Trees.

JUST as the manuscript was going to the press, Mr. Rademaker, the Portuguese Agent in London, called and told me, that he had received a letter from the Chevalier d'Almeida, the late Ambassador from Portugal at this court, informing him, that on his return home he had found the orange-tress on the Prince of Brazil's plantations in a very unhealthy and decayed state; and requesting him to apply to me for some of the composition, and a copy of the pamphlet "On the Diseases, &c. in Fruit and Forest-Trees;" as he wished to make trial of it on the trees of that country.

Accordingly, I have sent a cask of the composition, with directions for preparing the trees, and laying it on.

When it is found necessary to head down orange-trees, I would advise not to cut them quite down to the stem; but to leave two or three inches of the branches; some more, some less; always remembering to cut near to a joint, and in such a manner as to form a handsome head; and to apply the composition immediately. In doing this, however, it will be necessary to leave a few young shoots to draw up the sap. If the trees are infested with insects, the stems must be washed with soap-suds and urine, and well scrubbed with a hard brush.

About twelve years ago the orange-trees in the green house in Kensington gardens were so much infested with a species of coccus, that I was obliged to head them all down, and clean off the insects as above directed; applying the composition immediately after. These trees throve amazingly; and in three years, without any bottom heat, the heads were as large as before they were cut; and they still continue in a flourishing and fruitful state.

I would advise to rub off the side shoots, as directed for other fruit-trees, and to keep the heads thin of wood.

I thought it proper to insert the above for the information of those who have orange-trees in this country, as well as for those who have them abroad.

EXPLANATIONS

OF

THE ENGRAVINGS.

Plate I.

Fig 2.

Plate I.

APRICOT.

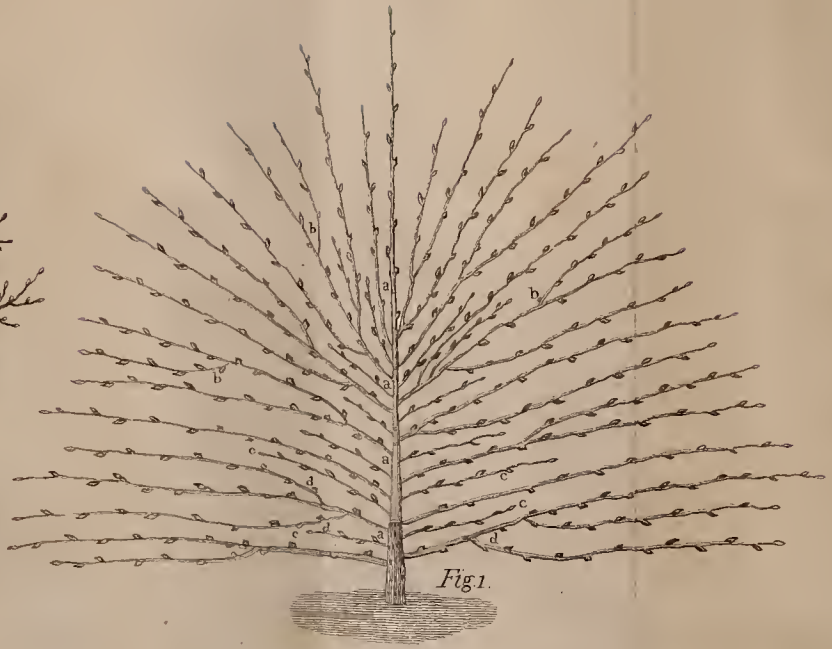

Fig 1.

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EXPLANATION OF PLATE 1.

Fig. 1.

Represents an old apricot-tree, after the last pruning in summer, in the fourth year after heading down. The lower part of the trunk is represented as covered with a rough bark, which must be pared off when it happens to be cankery.

a, *a*, *a*, *a*. The cicatrices of the four different years' heading, which should be performed at the time of the winter or spring pruning.

b, *b*, *b*. Forked shoots which are laid in, in summer, and cut off at *b* in the winter pruning, that the leading shoots may be always left without forks.

As the small shoots *c*, *c*, *c*, from the stem, advance, the larger forked shoots should be cut out, as at *d*, *d*, *d*, to make room for them to be trained horizontally.

Fig. 2.

Is an old branch of an apricot trained up according to the old method, leaving above three-fourths of the wall naked. Such branches should be cut down as near to the place where the tree was first budded as possible, as at *e*, on purpose to fill the wall with fine new wood.

.....

EXPLANATION OF PLATE 2.

Fig. 1.

An old hollow Green Gage Plum-Tree the second year after heading down. This tree was very much decayed, having only a few inches of sound bark; many of the roots, being also rotten and decayed, were cut off, and an incision made at *a*, which produced a fresh root.

b. The first heading, close to a bud.

c, *c*. The new wood and bark growing over the hollow part *d*, which is covered with the composition.

e, *e*, &c. Where the second year's heading was performed.

f, *f*. Where the fore-right shoots are cut off during the winter or spring pruning.

g, *g*, *g*, &c. The fruit buds for next year, as they appear after the fore-right shoots are cut off, as at *f*, *f**.

Fig. 2.

A branch on a larger scale, to shew the manner of cutting those fore-right shoots which are full of fruit buds. This should be done at *h*, *h*, but not till the fruit is set; they afterwards form into dugs as below, in the same figure.

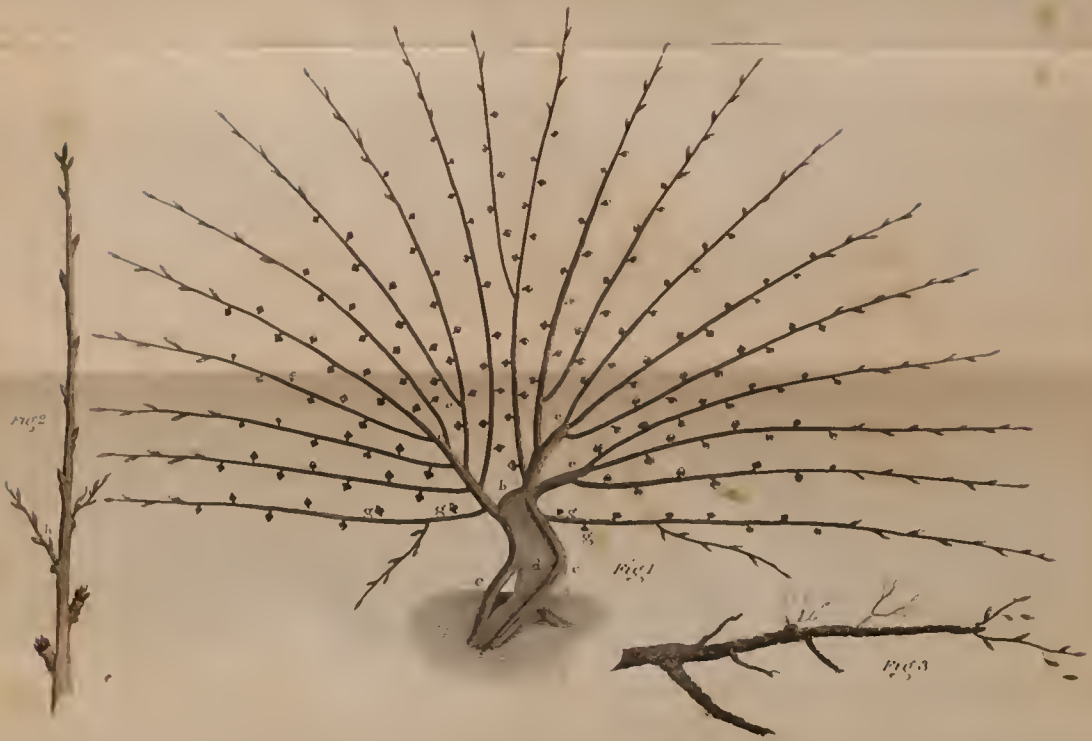
Fig. 3.

An old branch pruned in the common way, covered over with canker, and producing only small weak shoots, leaving the wall mostly naked.

* Owing to an error of the engraver, the *f*, *f* are omitted. They should be at the forks in the two lower branches. The *g* which is furthest to the left hand should not be there at all. Where the fork is, the shoot is cut off, which brings out the little new shoot. The long shoot is left in the plate to show what it was before it was cut off.

GREEN GAGE PLUMB TREE

GREEN GAGE PLUMB TREE



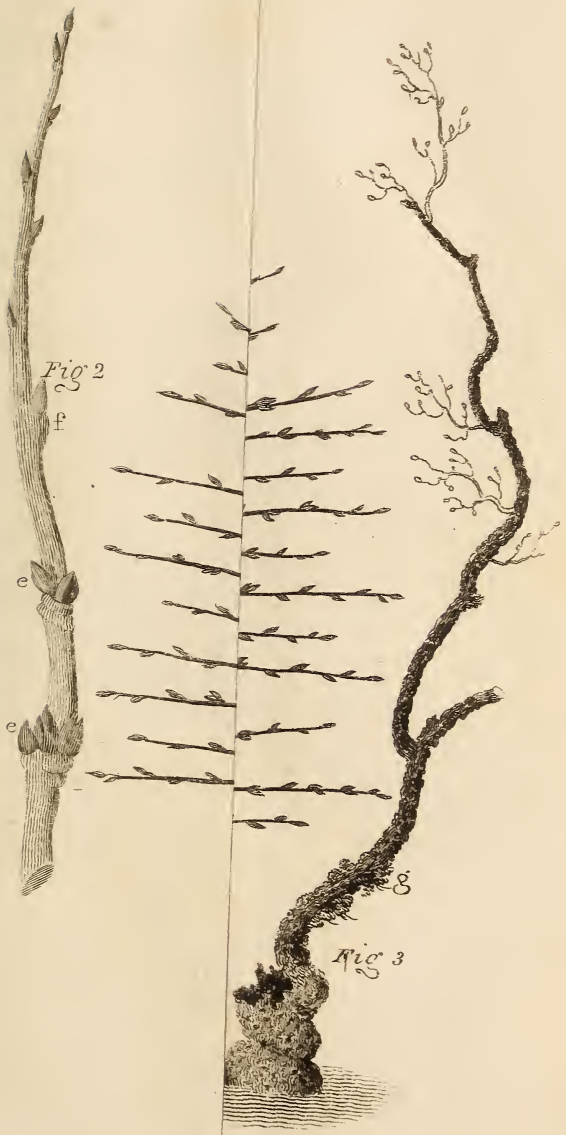


Fig 2
f
e
e
g
Fig 3

PEACH

.....

EXPLANATION OF PLATE 3.

Fig. 1.

An old hollow peach-tree, after the last nailing in summer, which had been headed down at *a*, four years ago. The hollow is covered over with the composition, and now nearly filled up. The heading must always be done as near to a bud as possible.

b, *b*, &*c*. Where the forked branches are to be cut, when the small shoots *c*, *c*, &*c*. are far enough advanced, that these may be trained horizontally.

When a shoot has single fruit-buds to the top, as at *d*, it must not be shortened but laid in at full length; or, if not wanted it must be cut clean out.

Fig. 2.

A branch on a larger scale.

e, *e*. Are double flower-buds, with wood-buds between them: The shoots should always be cut at such; but never at a single flower-bud, as at *f*; otherwise the shoot would die to the next wood-bud; and, if the pruning were done in a careless manner, would endanger the whole shoot. Those above *f*, are all wood-buds.

Fig. 3.

A branch of an old peach-tree pruned in the common way, which should be cut at *g*, and the young wood will soon cover the wall.

.....

EXPLANATION OF PLATE 4.

Fig. 1.

An old cherry-tree headed down at *c*. Before this its branches were covered with the gum and canker, as *Fig* 2.

The fore-right shoots should be tucked in, as directed for pears; and at the fall of the leaf, or in the month of February, they should be cut at *a*: These form the fruit-buds *b*, *b*, &c. all over the tree.

c, *c*, &c. The cicatrices where the leading shoot was headed in different seasons.

d, *d*. The composition applied where large limbs were cut off.

Fig. 2.

A branch of this tree before it was headed down.

e, *e*, &c. Branches injudiciously pruned in summer; which brings on the death of the shoot, and afterwards the gum and canker on the tree.

f, *f*, &c. The gum and canker in the last stage, which corrodes the whole tree if not carefully extirpated.

Fig 2

DUKE CHERRY TREE

Plate IV

STANDARD CHERRY

Plate V

.....

EXPLANATION OF PLATE 5.

An old cherry-tree, restored from two or three in ches of live bark, taken from the wall, and planted out as a dwarf standard: Now very fruitful.

a, *a*. The cicatrices where it was headed down the first and second time.

b. The hollow covered with the composition, and now nearly filled up with sound wood.

.....

EXPLANATION OF PLATE 6.

Fig. 1.

An old cankery apple-tree headed down four years ago, now bearing great plenty of fine fruit.

a. Where it was first headed down.

b and c. Two wounds covered with the composition, and now nearly filled up with sound wood.

The part of the trunk below *a* shews the cankery state of the bark; which rough cankery bark must always be pared off otherwise it will infect the new.

Fig. 2.

A branch shewing the method of keeping a regular succession of bearing wood.

d. A branch, which has done bearing, to be cut at *e*, and which is succeeded by the branch *f*; when that also is tired of bearing, it is to be cut at *g*, and will be succeeded by the branch *h*; and when that also is worn out, it is to be cut off at *i*. By proceeding in this manner, you will always be able to keep a regular succession of fine bearing wood.

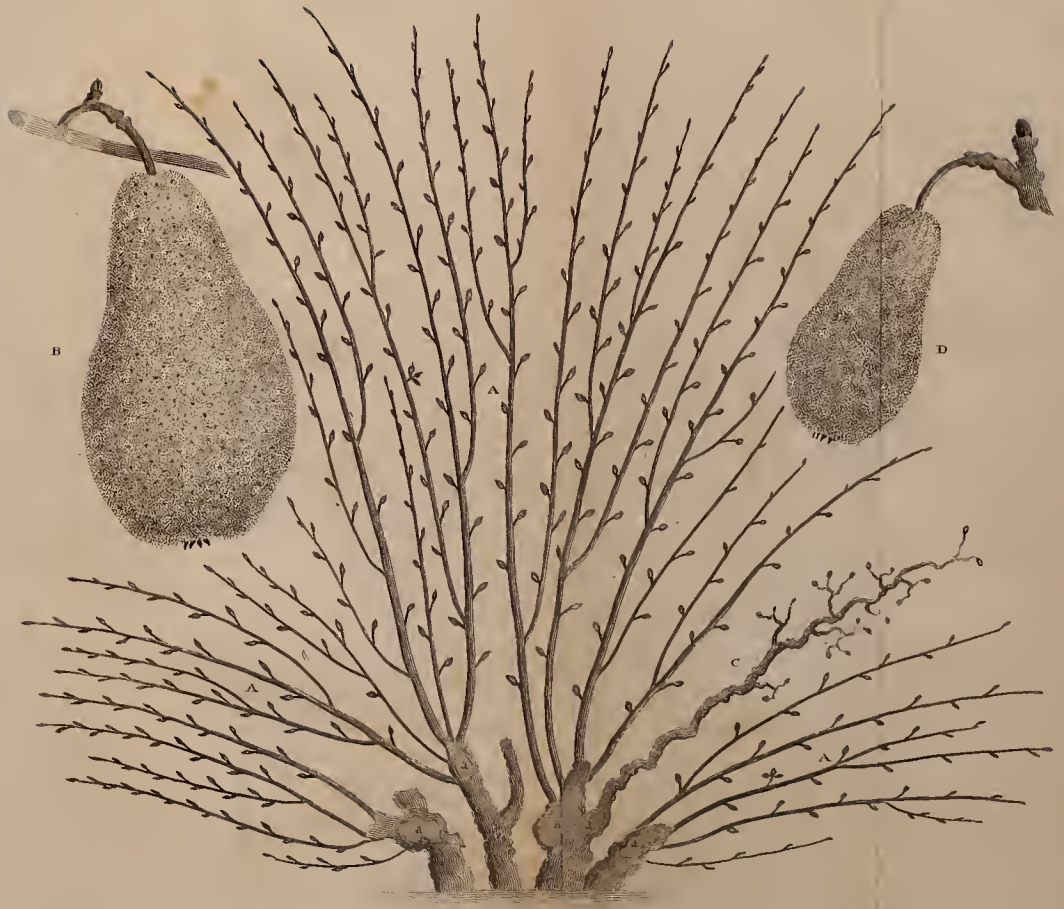
Plate VI

STANDARD APPLE TREE

Plate VI

B
D

St. Germain Pear Tree



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EXPLANATION OF PLATE 8.

Fig. 1.

An old decayed Beurré pear-tree headed down at *f*, and restored from one inch and a half of live bark.

a, *a*, *a*, &c. The fruit-buds for the present year.

b, *b*, *b*, &c. Those forming for next year.

c, *c*, &c. The foot stalks of the fruit of last year, on which are forming buds for bearing in the second year.

d, *d*, &c. The fore-right shoots as they appear before they are cut off at *e*, in the autumn or spring pruning.

d. The manner of tucking in the fore-right branches.

f, *f*, &c. Cicatrices of the different headings, which cause the leading shoot to produce horizontal shoots.

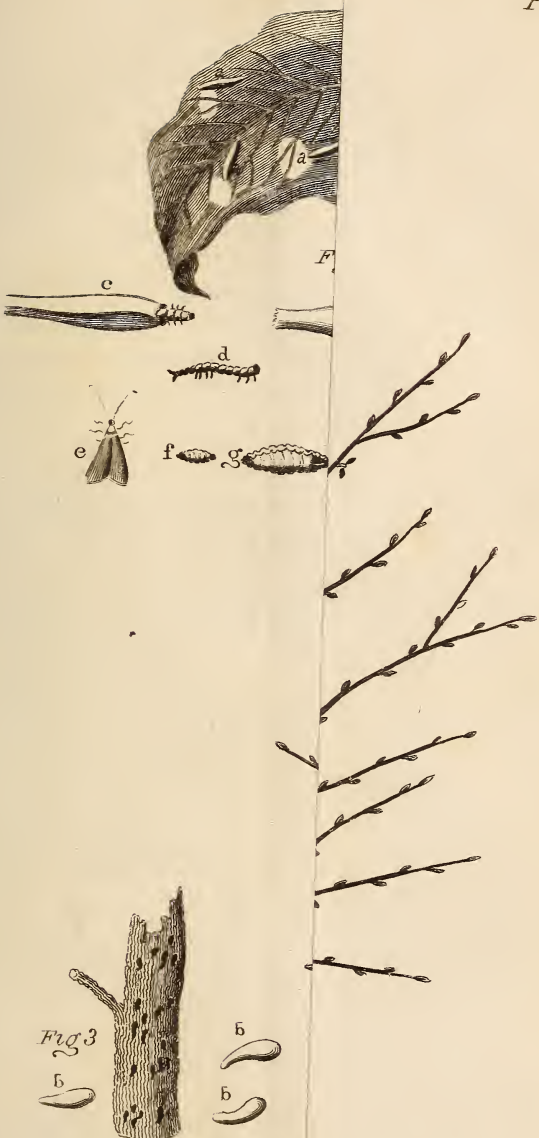
g, *g*. Large wounds, having the composition applied, healing up.

Fig. 2.

An old branch of the same tree before it was headed down, trained and pruned in the old way, with spurs standing out a foot, or a foot and a half, from the wall; and the rough bark, infested with a destructive insect, which is described and a method of cure given, in *chap.* 28. *See Coccus, and Plate* 9. *Fig.* 3.

White Beurre Pear Tree

White Beurre Pear Tree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Frig 3
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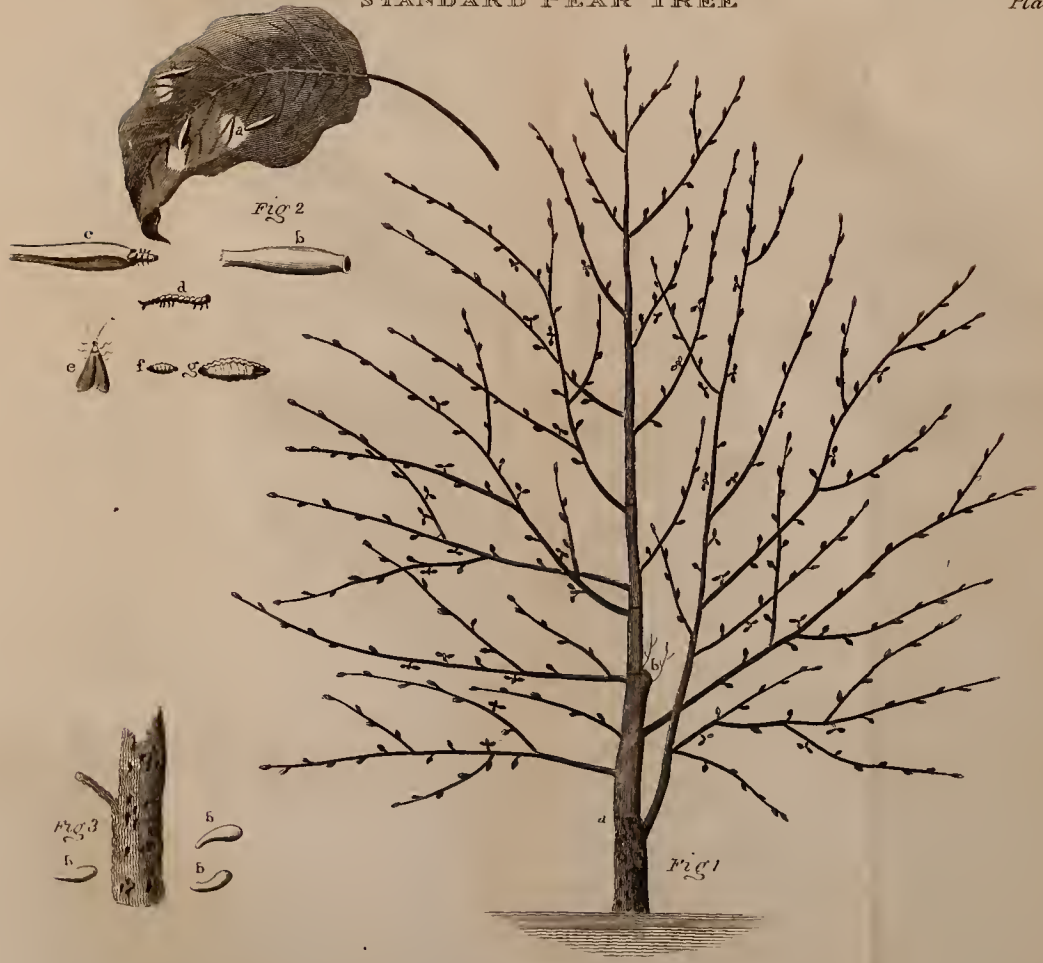
б
б


a
Fig 2
c
b
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e
f
g
Fig 3
b
b
b
Fig 1

.....

EXPLANATION OF PLATE 9.

Fig. 1.

An old Bergamot Pear headed down at the cicatrix *a*, taken from the wall and planted out as a dwarf standard.

b. A wound, covered with the composition, where a large upright shoot was cut off, to give the leading shoot freedom to grow straight.

Fig. 2.

The different appearances of the insect so destructive to pear-trees, mentioned in the *Chapter On Insects*, under the head *Caterpillar*.

This insect is inclosed in a case, and, when fixed on the leaf on which it feeds, appears as represented at *a*, *a*, *a*, which is about its natural size.

b. The case magnified.

c. The case, with the Insect in motion, magnified.

d. The Insect magnified.

e. The Moth.

f. The Chrysalis.

g. The Chrysalis magnified.

Fig. 3.

The coccus which infests peach, nectarine, and pear-trees.

a, *a*, *a*. The insect, the natural size, on a branch of a pear-tree.

b, *b*, *b*. The same magnified*.

* This is, most assuredly, the very insect that destroys the peach tree in America, and the reader has nothing to do but to look at the chapter on insects, to know how to kill the insect, and preserve the tree.

.....

EXPLANATION OF PLATE 10.

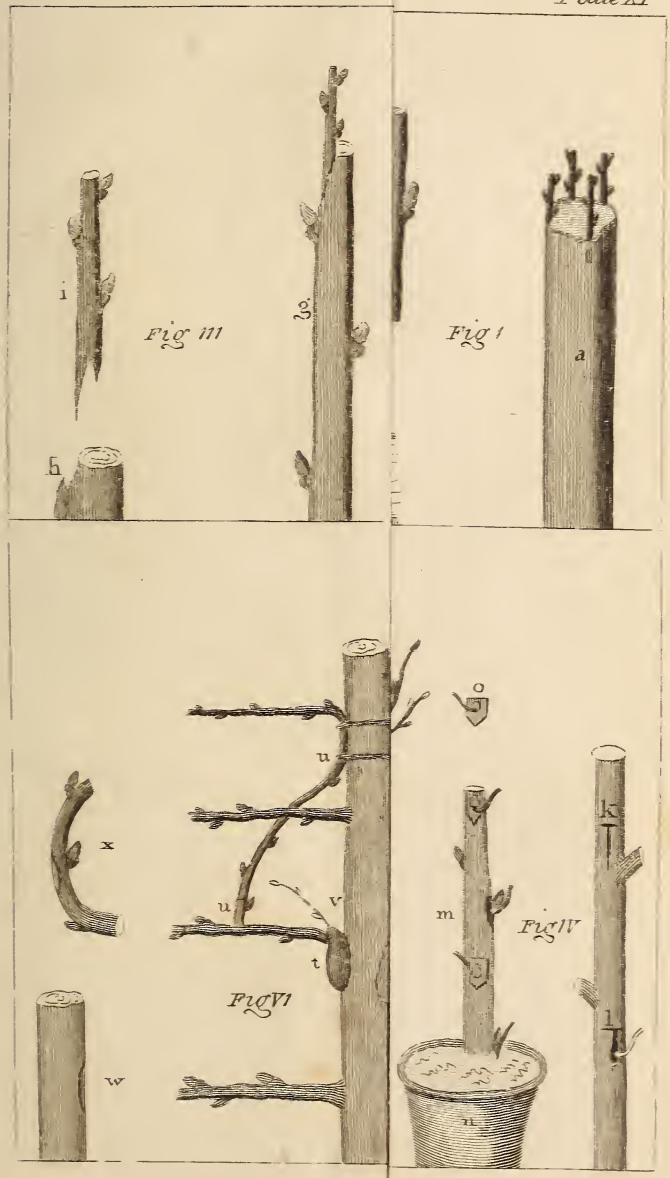
a, *a*, *a*, &*c*. The young bearing wood of a vine trained in a serpentine manner, with the buds for the present year appearing. These shoots are generally cut out in the winter pruning, as low as *c*, *c*, *c*, &*c*. to produce wood for next year.

The shoots *b*, *b*, &c. produce fruit in the usual manner, also young wood for the following year, which must not be topped, but only have the side shoots picked off. Two or three of the strongest young shoots from each of those *b*, *b*, &*c*. will be sufficient and they must be laid in at full length.

Plate X

VINE

Plate XI



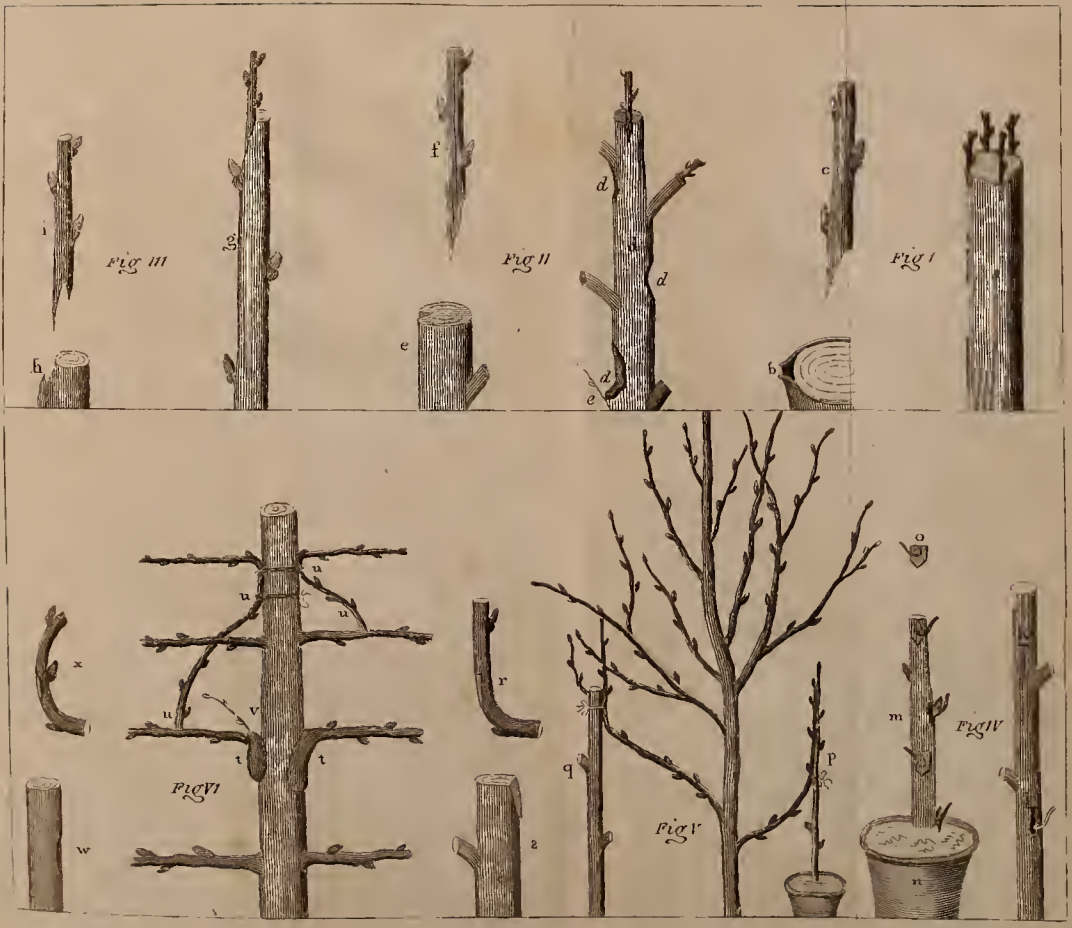

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Fig VI
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Fig V
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Fig IV

EXPLANATION OF PLATE 11.

Fig. 1.

GRAFTING in the rind, shoulder-grafting, or crown-grafting.

a. The stock grafted.

b. The manner of raising the bark to receive the cion or graft.

c. The graft prepared for inserting.

Fig. 2.

Cleft-grafting, stock-grafting, or slit-grafting.

d. The stock grafted.

e. The stock prepared for receiving the graft.

f. The cion ready for inserting.

d, d, d. Different views of incisions made for the purpose of obtaining young wood.

e. A young shoot coming out at the lower part of the incision.

Fig. 3.

Whip-grafting, or tongue-grafting.

g. The stock grafted.

h. The stock prepared.

i. The graft prepared for inserting.

Fig. 4.

Inoculating or budding.

k. The manner of making the incision in the bark.

l. The bud inserted, and the bark laid over it.

m. A shoot shewing the manner of cutting off the buds.

n. A vessel with a little loam, covered with wet moss, to stick the lower end of the shoot in, to keep it moist till used.

o. A bud taken off and ready for inserting.

Fig. 5 and 6.

Inarching, or grafting by approach.

p. Grafting on a stock in a pot.

q. Grafting on a stock growing near the tree from which it is to be grafted on.

r, s. The shoot and stock prepared.

t, t. Two branches inarched where the natural ones had failed, now properly united with the body of the tree; the lower parts being cut off.

u, u. Two branches lately inarched for the same purpose, and when properly united with the stem, are to be cut off at *u, u, u, u.*

w, x. The manner of preparing the stock and graft.

v. A natural shoot coming out where the branch was inarched the preceding year.

b
l
b

.....

EXPLANATION OF PLATE 12.

THIS plate represents an old stunted oak, which was headed down about six years ago. At that time it was full of wounds and blemishes, now nearly healed.

a. The place where the tree was headed, afterwards covered with the composition.

b, b, b. Three young shoots produced fine heading; there were several others, which were cut down as they advanced in growth; the two remaining side ones are also to be cut down and only the middle one left, which will in time cover the wound *a*, and form a proper tree.

c, c, c. Remains of the old wounds, covered with the composition, and now almost healed up.

.....

EXPLANATION OF PLATE 13.

Fig. 1 & 2.

Two different views of a tool for cutting out the dead and decayed parts of hollow trees. It has two wooden handles which may be of any convenient length.

Fig. 3 & 4.

Two views of another tool, with one handle, for cutting out dead wood. This is made narrower than the former, and is to be used in places where *Fig.* 1. cannot be admitted.

5. A triangular chisel, for cutting grooves or channels to carry off the water from the hollows of the trees.

6. A tool representing an adze on one side and a hatchet on the other.

7. A large chisel.

8. A large gouge.

9. A small saw, with double teeth, thin on the back, for cutting off small branches, &c.

10. A knife with a concave edge.

11. A tool in form of a sickle, without teeth. This is to scrape stems and branches of trees on the side next the wall.

12. A pruning-knife with a convex edge.

13. A tool in shape of a curry-comb for scraping moss, &c. off the stems and branches of trees: One of the scrapers has teeth; the other is plain. The back of this tool, and the edges of the scrapers, are a little concave.

14. A larger double-toothed saw for cutting off large branches.

15. A small pruning-knife with a convex edge.

16. A large chisel with a strong plate of iron screwed on upon the face of it, like a double iron for a plane, to prevent its running in too far where the tree is cross-grained.

N. B. These tools have handles of different lengths, to be used as occasion requires.

Plate XIII

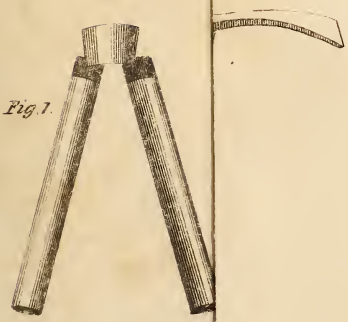

Fig. 1.

Fig. 7

Fig. 8. Fig. 9.

Fig. 15.

Fig. 16

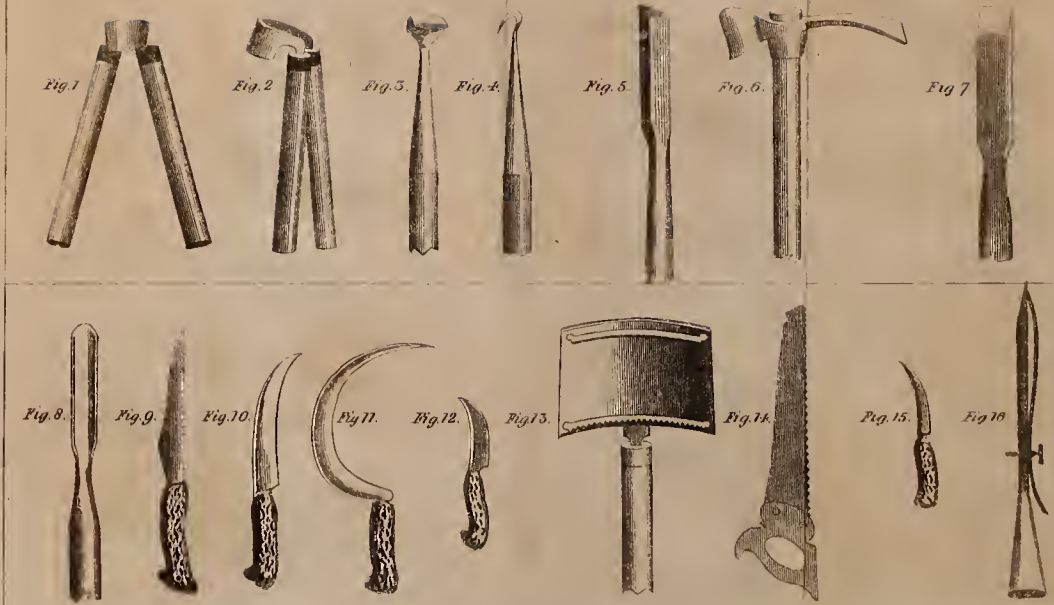
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Fig. 5.
Fig. 6.
Fig 7
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Deacidified using the Bookkeeper process.
Neutralizing agent: Magnesium Oxide
Treatment Date: September 2012

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